

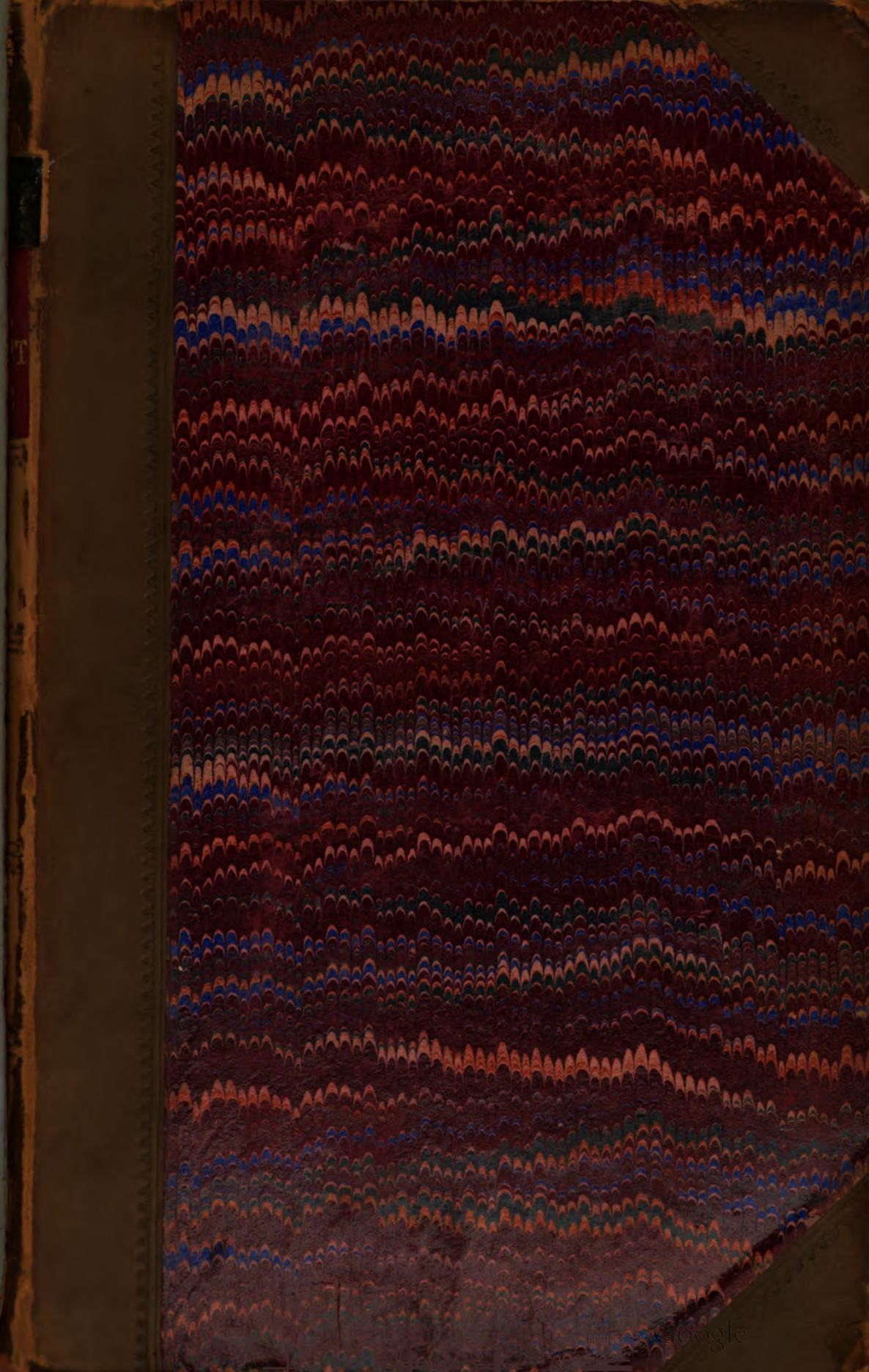
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# ARMY MEDICAL DEPARTMENT

## REPORT

FOR THE YEAR 1876. ..

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VOLUME XVIII.

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*Presented to both Houses of Parliament by Command of Her Majesty.*

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1877.





TO THE RIGHT HONOURABLE  
THE SECRETARY OF STATE FOR WAR.

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SIR,

IN accordance with instructions laid down for the conduct of business by the Director-General and Heads of Branches of the Army Medical Department, I have the honour to submit the accompanying Report on the Health of the Army in 1876, and on various matters connected with the duties of the Officers of the Department.

The Statistical, Sanitary, and Medical Reports have been drawn up by the Officers in charge of the respective Branches.

I have the honour to be,

SIR,

Your most obedient

Humble Servant,

W. M. MUIR,

*Director-General.*

ARMY MEDICAL DEPARTMENT,  
November, 1877.



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# ARMY MEDICAL DEPARTMENT

## REPORT FOR 1876.

### STATISTICAL REPORT.

THE average annual strength of the troops serving at home and abroad in 1876, as computed from the returns received by the Army Medical Department, was 169,197 non-commissioned officers and men (exclusive of the Royal Malta Fencible Artillery, the 1st and 2nd West India Regiments, and the Gun Lascars at Ceylon, and at Hong Kong, Corps which are not recruited at home); the admissions into hospital in this force were 166,319, and the deaths, 1,921. The rates represented by these numbers are for admissions into hospital, 983, and for deaths, 11·03 per 1,000 of the average annual strength, the latter being calculated on a strength of 174,220, which includes detached men.

The statistics of some of the most important of the results of sickness, in every Command in which the troops were stationed, are exhibited in the following Table :—

1876.

| White Troops.                         | Average Annual Strength. | Admitted into Hospital. | Died.        | Sent Home as Invalids. | Discharged as Invalids. | Constantly non-effective from Sickness, exclusive of those on board Ship. |
|---------------------------------------|--------------------------|-------------------------|--------------|------------------------|-------------------------|---------------------------------------------------------------------------|
| <b>Troops at Home and Abroad .. }</b> | <b>169,197</b>           | <b>166,319</b>          | <b>1,921</b> | <b>2,649</b>           | <b>3,769</b>            | <b>7436·12</b>                                                            |
| United Kingdom ..                     | 87,758                   | 71,405                  | 782          | ..                     | 2,370                   | 3474·76                                                                   |
| Gibraltar.. ..                        | 4,695                    | 3,129                   | 36           | 39                     | 26                      | 175·60                                                                    |
| Malta .. ..                           | 4,539                    | 3,644                   | 47           | 95                     | 58                      | 198·94                                                                    |
| Dominion of Canada ..                 | 1,760                    | 1,084                   | 8            | 36                     | 19                      | 51·74                                                                     |
| Bermuda.. ..                          | 1,934                    | 1,166                   | 15           | 57                     | 22                      | 66·42                                                                     |
| West Indies .. ..                     | 1,086                    | 823                     | 4            | 5                      | 4                       | 45·00                                                                     |
| Cape of Good Hope and St. Helena.. }  | 2,739                    | 2,096                   | 21           | 28                     | 25                      | 110·00                                                                    |
| Mauritius .. ..                       | 440                      | 712                     | 3            | 9                      | 8                       | 16·62                                                                     |
| Ceylon .. ..                          | 1,076                    | 795                     | 8            | 28                     | 18                      | 54·98                                                                     |
| China and Straits Settlements .. }    | 2,589                    | 2,614                   | 42           | 61                     | 22                      | 107·01                                                                    |
| Fiji .. ..                            | 57                       | 114                     | 3            | 5                      | ..                      | 5·05                                                                      |
| India .. ..                           | 58,641                   | 77,998                  | 944          | 2,286                  | 1,202                   | 3130·00                                                                   |
| On board Ship .. ..                   | 1,883                    | 740                     | 8            | ..                     | ..                      | ..                                                                        |

*Troops at  
Home and  
Abroad.*

| 1876.—Annual Ratio per 1,000 of Mean Strength. |                         |              |                        |                         |                                         |              | Average Sick-time to each Man. | Average duration of each case of Sickness. |
|------------------------------------------------|-------------------------|--------------|------------------------|-------------------------|-----------------------------------------|--------------|--------------------------------|--------------------------------------------|
| White Troops.                                  | Admitted into Hospital. | Died.        | Sent Home as Invalids. | Discharged as Invalids. | Constantly non-effective from Sickness. |              |                                |                                            |
| <b>Troops at Home and Abroad .. ..</b>         | <b>983·0</b>            | <b>11·03</b> | <b>32·53*</b>          | <b>21·63</b>            | <b>43·95</b>                            | <b>Days.</b> | <b>16·04</b>                   | <b>Days.</b>                               |
| United Kingdom .. ..                           | 813·7                   | 8·43         | ..                     | 25·54                   | 39·60                                   | 14·45        | 17·46                          |                                            |
| Gibraltar .. ..                                | 666·4                   | 7·67         | 8·31                   | 5·54                    | 37·40                                   | 13·65        | 20·48                          |                                            |
| Malta .. ..                                    | 802·8                   | 10·35        | 20·93                  | 12·80                   | 43·83                                   | 16·00        | 19·93                          |                                            |
| Dominion of Canada .. ..                       | 615·9                   | 4·55         | 20·45                  | 10·63                   | 29·40                                   | 10·73        | 17·00                          |                                            |
| Bermuda .. ..                                  | 802·8                   | 7·76         | 29·47                  | 11·37                   | 34·34                                   | 12·54        | 20·79                          |                                            |
| West Indies .. ..                              | 757·8                   | 3·68         | 4·60                   | 8·68                    | 41·44                                   | 15·12        | 19·96                          |                                            |
| Cape of Good Hope and St. Helena .. ..         | 764·9                   | 7·67         | 10·22                  | 9·13                    | 40·16                                   | 14·66        | 19·16                          |                                            |
| Mauritius .. ..                                | 1618·2                  | 6·81         | 20·45                  | 18·18                   | 37·77                                   | 13·79        | 8·52                           |                                            |
| Ceylon .. ..                                   | 738·8                   | 7·43         | 26·02                  | 12·08                   | 51·10                                   | 18·65        | 25·24                          |                                            |
| China and Straits Settlements .. ..            | 1009·7                  | 16·22        | 23·56                  | 8·50                    | 41·33                                   | 15·09        | 14·95                          |                                            |
| Fiji .. ..                                     | 2000·0                  | 52·63        | 87·72                  | ..                      | 88·60                                   | 32·34        | 16·16                          |                                            |
| India .. ..                                    | 1330·1                  | 16·10        | 38·98                  | 20·50                   | 53·88                                   | 19·48        | 14·65                          |                                            |
| On board Ship .. ..                            | 393·0                   | 4·25         | ..                     | ..                      | ..                                      | ..           | ..                             |                                            |

\* Calculated on Strength excluding United Kingdom.

#### 10 YEARS—1866 TO 1875.

| White Troops.                          | Aggregate Strength for 10 Years. | Admitted into Hospital. | Died.         | Sent Home as Invalids. | Discharged as Invalids. | Constantly non-effective from Sickness. |
|----------------------------------------|----------------------------------|-------------------------|---------------|------------------------|-------------------------|-----------------------------------------|
| <b>Troops at Home and Abroad ..</b>    | <b>1,679,181</b>                 | <b>1,723,137</b>        | <b>23,892</b> | <b>31,940</b>          | <b>36,202</b>           | <b>75,451</b>                           |
| United Kingdom .. ..                   | 819,868                          | 675,372                 | 7,817         | ..                     | 22,699                  | 32,843                                  |
| Gibraltar .. ..                        | 45,021                           | 29,443                  | 287           | 1,229                  | 792                     | 1,497                                   |
| Malta .. ..                            | 48,700                           | 39,867                  | 609           | 1,248                  | 842                     | 2,004                                   |
| Dominion of Canada .. ..               | 64,063                           | 41,229                  | 594           | 1,089                  | 862                     | 1,997                                   |
| Bermuda .. ..                          | 17,312                           | 12,223                  | 255           | 389                    | 246                     | 614                                     |
| West Indies .. ..                      | 13,968                           | 13,947                  | 230           | 393                    | 181                     | 614                                     |
| Cape of Good Hope and St. Helena .. .. | 33,146                           | 34,151                  | 356           | 857                    | 618                     | 1,645                                   |
| Mauritius .. ..                        | 7,865                            | 12,379                  | 168           | 342                    | 109                     | 445                                     |
| Ceylon .. ..                           | 9,416                            | 10,309                  | 166           | 390                    | 168                     | 478                                     |
| China and Straits Settlements .. ..    | 13,222                           | 19,457                  | 225           | 747                    | 381                     | 743                                     |
| India .. ..                            | 574,215                          | 816,401                 | 12,893        | 25,266                 | 9,304                   | 32,572                                  |
| On board Ship .. ..                    | 32,385                           | 18,359                  | 292           | ..                     | ..                      | ..                                      |



| 1866-75.—Annual Rate per 1,000 of Mean Strength. |                         |              |                        |                         |                                         | Average Sick-time to each Man. | Average duration of each case of Sickness. | <i>Troops at Home and Abroad.</i> |
|--------------------------------------------------|-------------------------|--------------|------------------------|-------------------------|-----------------------------------------|--------------------------------|--------------------------------------------|-----------------------------------|
| White Troops.                                    | Admitted into Hospital. | Died.        | Sent Home as Invalids. | Discharged as Invalids. | Constantly non-effective from Sickness. |                                |                                            |                                   |
| <b>Troops at Home and Abroad .. ..</b>           | <b>1026·2</b>           | <b>13·91</b> | <b>37·17*</b>          | <b>21·10</b>            | <b>44·93</b>                            | <b>16·40</b>                   | <b>16·01</b>                               |                                   |
| United Kingdom .. ..                             | 823·8                   | 9·11         | ..                     | 26·45                   | 40·06                                   | 14·62                          | 17·75                                      |                                   |
| Gibraltar .. ..                                  | 654·0                   | 6·37         | 27·30                  | 17·59                   | 33·25                                   | 12·14                          | 18·56                                      |                                   |
| Malta .. ..                                      | 818·6                   | 12·51        | 25·63                  | 17·29                   | 41·15                                   | 15·02                          | 18·35                                      |                                   |
| Dominion of Canada..                             | 642·1                   | 9·27         | 17·00                  | 13·46                   | 31·17                                   | 11·38                          | 17·68                                      |                                   |
| Bermuda .. ..                                    | 706·0                   | 14·73        | 22·47                  | 14·21                   | 35·47                                   | 12·94                          | 18·33                                      |                                   |
| West Indies .. ..                                | 998·6                   | 16·47        | 28·14                  | 12·96                   | 43·96                                   | 16·04                          | 16·07                                      |                                   |
| Cape of Good Hope and St. Helena .. ..           | 1030·3                  | 10·74        | 25·85                  | 18·64                   | 49·63                                   | 18·12                          | 17·59                                      |                                   |
| Mauritius .. ..                                  | 1573·9                  | 21·36        | 43·48                  | 13·86                   | 56·58                                   | 20·65                          | 13·12                                      |                                   |
| Ceylon .. ..                                     | 1094·8                  | 17·63        | 40·36                  | 17·84                   | 50·76                                   | 18·53                          | 16·92                                      |                                   |
| China and Straits Settlements                    | 1471·6                  | 17·02        | 56·50                  | 28·82                   | 56·19                                   | 20·51                          | 13·94                                      |                                   |
| India .. ..                                      | 1421·7                  | 22·45        | 44·00                  | 16·20                   | 56·72                                   | 20·71                          | 14·62                                      |                                   |
| On board Ship .. ..                              | 566·9                   | 9·02         | ..                     | ..                      | ..                                      | ..                             | ..                                         |                                   |

\* Calculated on Strength excluding United Kingdom.

## II.—ON THE HEALTH OF THE TROOPS SERVING IN THE UNITED KINGDOM.

### Section I.

#### *Sickness and Mortality.*

#### STATISTICAL REPORT.

According to the returns received in the Army Medical Department, the average annual strength of the non-commissioned officers and men in the United Kingdom was 87,758; the admissions into hospital in this number were 71,405, being in the rate of 813·7 per 1,000 of the strength; the average number of men in hospital daily throughout the year was 3,475, being in the rate of 39·60 per 1,000; there were 699 deaths amongst the men present with their corps, and 83 deaths amongst men detached (the average number of whom is given in the Adjutant-General's Return as 5,023); the death-rate of the non-commissioned officers and men in 1876, is therefore 8·43 per 1,000 of the strength.

Compared with the corresponding rates of the preceding year, there is a decrease of 17·6 per 1,000 men for admissions, of ·93 per 1,000 for deaths, and of ·87 per 1,000 for daily sick.

The classes and orders of diseases to which the admissions and deaths were due, are shown in the following Table:—

United  
Kingdom.

| Orders.              | Average Strength in Weekly Returns, 87,758.<br><br>Average Strength, including men detached, 92,781. | Admitted into Hospital. | Died.              |                           |        | Ratio per 1,000 of Mean Strength. |       |           |       |  |
|----------------------|------------------------------------------------------------------------------------------------------|-------------------------|--------------------|---------------------------|--------|-----------------------------------|-------|-----------|-------|--|
|                      |                                                                                                      |                         | With the Regiment. | Absent from the Regiment. | Total. | 1876.                             |       | 1869-75.  |       |  |
|                      |                                                                                                      |                         |                    |                           |        | Admitted.                         | Died. | Admitted. | Died. |  |
| I. General Diseases. |                                                                                                      |                         |                    |                           |        |                                   |       |           |       |  |
| 1                    | Febrile Group ..                                                                                     | 3,787                   | 41                 | 6                         | 47     | 43·1                              | ·51   | 52·7      | ·61   |  |
| 2                    | Constitutional „ ..                                                                                  | 11,955                  | 270                | 20                        | 290    | 136·2                             | 3·13  | 150·7     | 2·84  |  |
| II. Local Diseases.  |                                                                                                      |                         |                    |                           |        |                                   |       |           |       |  |
| Diseases of the—     |                                                                                                      |                         |                    |                           |        |                                   |       |           |       |  |
| 1                    | Nervous System ..                                                                                    | 1,221                   | 48                 | 15                        | 63     | 13·9                              | ·68   | 11·7      | ·57   |  |
| 2                    | Eye .. ..                                                                                            | 1,472                   | ..                 | ..                        | ..     | 16·8                              | ..    | 15·9      | ..    |  |
| 3                    | Ear .. ..                                                                                            | 347                     | ..                 | ..                        | ..     | 4·0                               | ..    | 3·7       | } ·01 |  |
| 4                    | Nose .. ..                                                                                           | 61                      | ..                 | ..                        | ..     | ·7                                | ..    | ·4        |       |  |
| 5                    | Circulatory System ..                                                                                | 1,313                   | 108                | 13                        | 121    | 15·0                              | 1·30  | 13·8      | 1·49  |  |
| 6                    | Absorbent „ ..                                                                                       | 1,343                   | ..                 | ..                        | ..     | } 15·3                            | ..    | 13·5      | ·01   |  |
| 7                    | Ductless Glands ..                                                                                   | 3                       | ..                 | ..                        | ..     |                                   | ..    | ..        | ..    |  |
| 8                    | Respiratory System ..                                                                                | 7,910                   | 96                 | 7                         | 103    | 90·1                              | 1·11  | 85·2      | 1·40  |  |
| 9                    | Digestive „ ..                                                                                       | 9,979                   | 47                 | 3                         | 50     | 113·7                             | ·54   | 103·7     | ·59   |  |
| 10                   | Urinary „ ..                                                                                         | 6,966                   | 17                 | 3                         | 20     | 79·4                              | ·22   | 100·8     | ·28   |  |
| 11                   | Generative „ ..                                                                                      | 1,050                   | ..                 | ..                        | ..     | 12·0                              | ..    | 12·4      | } ·04 |  |
| 12                   | Organs of Locomotion ..                                                                              | 487                     | 10                 | ..                        | 10     | 5·6                               | ·11   | 4·9       |       |  |
| 13                   | Cellular Tissue ..                                                                                   | 2,020                   | 2                  | ..                        | 2      | 23·0                              | ·02   | 22·1      | } ·02 |  |
| 14                   | Cutaneous System ..                                                                                  | 9,503                   | ..                 | ..                        | ..     | 108·2                             | ..    | 98·1      |       |  |
| III. Conditions, &c. |                                                                                                      |                         |                    |                           |        |                                   |       |           |       |  |
|                      | Debility .. ..                                                                                       | 1,027                   | 1                  | ..                        | 1      | 11·7                              | ·01   | 7·4       | ·01   |  |
|                      | IV. Poisons ..                                                                                       | 276                     | 2                  | 1                         | 3      | 3·1                               | ·03   | 2·6       | ·10   |  |
| V. Injuries.         |                                                                                                      |                         |                    |                           |        |                                   |       |           |       |  |
| 1                    | Battle .. ..                                                                                         | 6                       | ..                 | ..                        | ..     | ·1                                | ..    | ..        | } ..  |  |
| 2                    | Accidental .. ..                                                                                     | 10,482                  | 34                 | 10                        | 44     | 119·5                             | ·47   | 102·6     |       |  |
| 3                    | Homicidal .. ..                                                                                      | 1                       | 4                  | ..                        | 4      | ..                                | ·04   | ..        | } ·03 |  |
| 4                    | Self-inflicted .. ..                                                                                 | 17                      | 18                 | 1                         | 19     | ·2                                | ·21   | ·2        |       |  |
| 6                    | Judicial .. ..                                                                                       | 7                       | ..                 | ..                        | ..     | ·1                                | ..    | ..        | } ·01 |  |
|                      | VI. Surgical Operations                                                                              | 17                      | ..                 | ..                        | ..     | ·2                                | ..    | ·3        |       |  |
|                      | No appreciable disease                                                                               | 148                     | ..                 | ..                        | ..     | 1·7                               | ..    | 1·4       | } ·02 |  |
|                      | Not known .. ..                                                                                      | 7                       | 1                  | 4                         | 5      | ·1                                | ·05   | ..        |       |  |
|                      | Total .. ..                                                                                          | 71,405                  | 699                | 83                        | 782    | 813·7                             | 8·43  | 804·      | 8·80  |  |

**GENERAL DISEASES.**—There is a small decrease (9·4 per 1,000 men) in the rate of prevalence of diseases of this class on that of the preceding year, the greater part of which is in the *constitutional group*, the rate of the *febrile group*, is only a little lower. The rate of mortality for the class is fractionally higher than in 1875, the whole of the increase occurs in the constitutional group.

The admissions and deaths from the principal diseases of this class, are shown in the following Table :—

| Strength, 87,758.               | Died.     |                       |                                 |        | Ratio per 1,000<br>of Mean<br>Strength. |       | United<br>Kingdom. |
|---------------------------------|-----------|-----------------------|---------------------------------|--------|-----------------------------------------|-------|--------------------|
| General Diseases.               | Admitted. | With the<br>Regiment. | Absent<br>from the<br>Regiment. | Total. | Admitted.                               | Died. |                    |
| <i>Febrile—</i>                 |           |                       |                                 |        |                                         |       |                    |
| Eruptive Fevers .. .. .         | 371       | 5                     | 1                               | 6      | 4.2                                     | .06   |                    |
| Continued „ .. .. .             | 1,808     | 21                    | 4                               | 25     | 20.6                                    | .27   |                    |
| Paroxysmal „ .. .. .            | 742       | ..                    | ..                              | ..     | 8.4                                     | ..    |                    |
| Influenza .. .. .               | 551       | ..                    | ..                              | ..     | 6.3                                     | ..    |                    |
| Erysipelas .. .. .              | 173       | 8                     | ..                              | 8      | 2.0                                     | .09   |                    |
| Other diseases .. .. .          | 142       | 7                     | 1                               | 8      | 1.6                                     | .09   |                    |
| Total of Febrile Group.. ..     | 3,787     | 41                    | 6                               | 47     | 43.1                                    | .51   |                    |
| <i>Constitutional—</i>          |           |                       |                                 |        |                                         |       |                    |
| Rheumatism .. .. .              | 4,126     | 2                     | ..                              | 2      | 47.0                                    | .02   |                    |
| Syphilis .. .. .                | 6,444     | 5                     | ..                              | 5      | 73.4                                    | .06   |                    |
| Scorfula, Phthisis, &c. ..      | 1,130     | 247                   | 19                              | 266    | 12.9                                    | 2.87  |                    |
| Scurvy and Purpura .. .. .      | 29        | 3                     | ..                              | 3      | .3                                      | .03   |                    |
| Anæmia.. .. .                   | 117       | 1                     | ..                              | 1      | 1.3                                     | .01   |                    |
| Other diseases .. .. .          | 109       | 12                    | 1                               | 13     | 1.3                                     | .14   |                    |
| Total of Constitutional Group.. | 11,955    | 270                   | 20                              | 290    | 136.2                                   | 3.13  |                    |

**LOCAL DISEASES.**—Compared with the preceding year, there is a reduction in the rate of admissions of diseases of the *nervous, circulatory, respiratory, digestive and generative systems*, in no instance a material one, the greatest being in that of the respiratory system, for which it amounts to 12.6 per 1,000 men only; diseases of the *absorbent, urinary, locomotive, and cutaneous systems*, give slightly higher rates, the greatest being 8.6 per 1,000 men for diseases of the urinary system. With lower rates of prevalence there are lower rates of mortality in diseases of the *circulatory, respiratory, and digestive systems*, the decrease in that of the *respiratory system*, amounting to the relatively large proportion of .66 per 1,000 men. For diseases of the *organs of locomotion*, the rate of mortality is .07 per 1,000 men higher than in 1876.

**CONDITIONS, &c.—Debility.**—The rate of admissions is a little lower (1.6 per 1,000 men) than in the preceding year.

**POISONS.**—The rate of admissions is only fractionally different from that of 1875, but the death rate is .14 per 1,000 men lower, being less than one-fifth of that for the preceding year.

**INJURIES—Accidental.**—The rate of admissions is nearly the same as that for the preceding year, the death rate is .12 per 1,000 lower; *homicidal deaths* are in a four-fold, and *self-inflicted deaths* are in nearly a two-fold higher rate, than in 1876.

The admissions and deaths in the various Military Districts are shown in the following Table:—

United  
Kingdom.

| Military Districts.         | Average Annual Strength. | Admitted into Hospital. | Died. | Average Number constantly Sick. | Ratio per 1,000 of Mean Strength. |       |                  |
|-----------------------------|--------------------------|-------------------------|-------|---------------------------------|-----------------------------------|-------|------------------|
|                             |                          |                         |       |                                 | Admitted.                         | Died. | Constantly Sick. |
| 1. Northern .. ..           | 7,288                    | 6,649                   | 85    | 315·08                          | 912·3                             | 11·66 | 43·23            |
| 2. Eastern .. ..            | 4,214                    | 4,777                   | 29    | 209·88                          | 1133·4                            | 6·88  | 49·82            |
| 3. Western .. ..            | 4,926                    | 3,946                   | 44    | 193·87                          | 801·1                             | 8·93  | 39·36            |
| 4. Southern .. ..           | 8,779                    | 6,609                   | 83    | 354·44                          | 752·8                             | 9·45  | 40·37            |
| 5. Chatham .. ..            | 4,588                    | 3,109                   | 31    | 140·26                          | 677·6                             | 6·76  | 30·54            |
| 6. South-Eastern ..         | 7,589                    | 5,300                   | 37    | 265·07                          | 698·4                             | 4·88  | 34·93            |
| 7. Home .. ..               | 5,586                    | 5,173                   | 53    | 270·55                          | 926·1                             | 9·49  | 48·43            |
| 8. Woolwich .. ..           | 6,378                    | 5,549                   | 55    | 266·66                          | 870·0                             | 8·62  | 41·81            |
| 9. Aldershot .. ..          | 12,055                   | 10,661                  | 77    | 566·71                          | 884·4                             | 6·39  | 47·01            |
| 10. North British ..        | 3,336                    | 2,692                   | 33    | 135·27                          | 807·0                             | 9·89  | 40·55            |
| 11. Channel Islands ..      | 1,602                    | 1,264                   | 10    | 49·31                           | 789·0                             | 6·24  | 30·78            |
| 12. Belfast .. ..           | 2,494                    | 1,793                   | 24    | 84·81                           | 718·9                             | 9·62  | 34·01            |
| 13. Dublin .. ..            | 6,213                    | 5,469                   | 53    | 268·19                          | 880·3                             | 8·53  | 43·17            |
| 14. Curragh .. ..           | 4,112                    | 2,511                   | 26    | 125·92                          | 610·7                             | 6·32  | 30·62            |
| 15. Cork .. ..              | 7,533                    | 5,281                   | 58    | 228·74                          | 701·1                             | 7·70  | 30·37            |
| Mobilised Army Corps ..     | 1,065                    | 622                     | 1     | ..                              | 584·0                             | ·94   | ..               |
| Detached from their Corps } | 5,023                    | ..                      | 83    | ..                              | ..                                | ..    | ..               |
|                             | 92,781                   | 71,405                  | 782   | 3474·76                         | 813·7                             | 8·43  | 39·60            |

As in the preceding year the highest rate of admissions is that for the Eastern District, it exceeds the rate of the Home District, the next highest, by 207 per 1,000 men, and that of the Curragh, which has the lowest rate, by 522·7 per 1,000 men. The admission-rate of the Chatham District, which in 1875 was below that of any other, is the lowest but one in the present year. Compared with the preceding year the Eastern, Western, Chatham, Aldershot, North British, and Channel Islands Districts, have higher rates of admission, the remaining Districts have lower ones.

The results of sickness in the four permanent Camps (which are included in the above) are separately grouped in the following Table:—

|             | Average Annual Strength. | Admitted into Hospital. | Died. | Average Number constantly Sick. | Ratio per 1,000 of Mean Strength. |       |                  |
|-------------|--------------------------|-------------------------|-------|---------------------------------|-----------------------------------|-------|------------------|
|             |                          |                         |       |                                 | Admitted.                         | Died. | Constantly Sick. |
| Camps .. .. | 20,573                   | 17,339                  | 124   | 885·54                          | 842·8                             | 6·02  | 43·04            |

The admission-rate for Camps is 61·5 per 1,000 men lower than the corresponding rate for the preceding year.

The admissions and deaths in each class and order of diseases are shown in the following Tables:—

| Class. | Order. | Districts ...                   |                        | Belfast.  |       | Dublin.   |       | Curragh.  |       | Cork.     |       | Mobilized Army Corps. |       |
|--------|--------|---------------------------------|------------------------|-----------|-------|-----------|-------|-----------|-------|-----------|-------|-----------------------|-------|
|        |        | Average Strength                |                        | 2,494     |       | 6,213     |       | 4,112     |       | 7,533     |       | 1,665                 |       |
|        |        |                                 |                        | Admitted. | Died. | Admitted. | Died. | Admitted. | Died. | Admitted. | Died. | Admitted.             | Died. |
| I.     | 1      | General Diseases.               | Sub-div.               | 75        | 3     | 267       | 4     | 93        | 3     | 272       | 1     | 31                    | ...   |
|        | 2      |                                 | "                      | 295       | 11    | 1,001     | 23    | 403       | 12    | 773       | 29    | 98                    | ...   |
| II.    | 1      | Local Diseases.—Diseases of the | Nervous System         | 17        | 2     | 118       | 3     | 43        | 4     | 80        | 2     | 12                    | ...   |
|        | 2      |                                 | Eye ...                | 37        | ...   | 109       | ...   | 88        | ...   | 123       | ...   | 29                    | ...   |
|        | 3      |                                 | Ear... ..              | 12        | ...   | 27        | ...   | 16        | ...   | 33        | ...   | 3                     | ...   |
|        | 4      |                                 | Nose... ..             | ...       | ...   | 6         | ...   | ...       | ...   | 6         | ...   | ...                   | ...   |
|        | 5      |                                 | Circulatory System     | 34        | 1     | 95        | 4     | 52        | 2     | 103       | 11    | 12                    | ...   |
|        | 6      |                                 | Absorbent ..           | 35        | ...   | 127       | ...   | 51        | ...   | 91        | ...   | 17                    | ...   |
|        | 7      |                                 | Ductless Glands ..     | ...       | ...   | 1         | ...   | ...       | ...   | ...       | ...   | ...                   | ...   |
|        | 8      |                                 | Respiratory System     | 218       | 3     | 627       | 9     | 249       | 3     | 601       | 6     | 22                    | ...   |
|        | 9      |                                 | Digestive ..           | 219       | 3     | 687       | 2     | 345       | ...   | 824       | 3     | 72                    | ...   |
|        | 10     |                                 | Urinary ..             | 148       | 1     | 575       | 2     | 231       | ...   | 452       | ...   | 72                    | ...   |
|        | 11     |                                 | Generative ..          | 35        | ...   | 95        | ...   | 34        | ...   | 59        | ...   | 8                     | ...   |
|        | 12     |                                 | Organs of Locomotion   | 9         | ...   | 41        | 1     | 31        | 1     | 34        | 1     | 2                     | ...   |
|        | 13     |                                 | Cellular Tissue ...    | 73        | ...   | 165       | ...   | 78        | ...   | 161       | ...   | 20                    | ...   |
|        | 14     |                                 | Cutaneous System       | 280       | ...   | 661       | ...   | 414       | ...   | 732       | ...   | 93                    | ...   |
| III.   |        |                                 | Debility. ... ..       | 18        | ...   | 89        | ...   | 13        | ...   | 62        | 1     | 16                    | ...   |
| IV.    |        |                                 | Poisons ... ..         | 3         | ...   | 11        | ...   | 4         | ...   | 27        | ...   | ...                   | ...   |
| V.     | 1      | Injuries.                       | Battle ... ..          | ...       | ...   | ...       | ...   | ...       | ...   | ...       | ...   | ...                   | ...   |
|        | 2      |                                 | Accidental ... ..      | 290       | ...   | 757       | 2     | 357       | 1     | 836       | 2     | 108                   | ...   |
|        | 3      |                                 | Homicidal ... ..       | ...       | ...   | ...       | ...   | ...       | ...   | ...       | 1     | ...                   | ...   |
|        | 4      |                                 | Self-inflicted ... ..  | 1         | ...   | 3         | 3     | ...       | ...   | ...       | 1     | ...                   | ...   |
|        | 6      |                                 | Judicial ... ..        | ...       | ...   | ...       | ...   | ...       | ...   | 5         | ...   | ...                   | ...   |
| VI.    |        |                                 | Surgical Operations    | 1         | ...   | ...       | ...   | ...       | ...   | ...       | ...   | ...                   | ...   |
|        |        |                                 | No appreciable disease | 2         | ...   | 7         | ...   | 4         | ...   | 7         | ...   | ...                   | ...   |
|        |        |                                 | Not known ... ..       | ...       | ...   | ...       | ...   | ...       | ...   | ...       | ...   | 7                     | ...   |
|        |        |                                 | General Total ... ..   | 1,793     | 24    | 5,469     | 53    | 2,511     | 26    | 5,231     | 58    | 622                   | ...   |

United Kingdom.

19th.

United  
Kingdom

| ich. | Aldershot. |           | North British. |           | Channel Islands. |           | Belfast. |           | Dublin. |           | Curragh. |           | Cork. |           | Mobilised Army Corps. |     |
|------|------------|-----------|----------------|-----------|------------------|-----------|----------|-----------|---------|-----------|----------|-----------|-------|-----------|-----------------------|-----|
|      | Died.      | Admitted. | Died.          | Admitted. | Died.            | Admitted. | Died.    | Admitted. | Died.   | Admitted. | Died.    | Admitted. | Died. | Admitted. | Died.                 |     |
| 16   | 34.9       | 41        | 59.6           | 90        | 43.1             | 62        | 30.1     | 1.20      | 43.0    | 65        | 22.6     | 73        | 36.1  | 13        | 29.1                  | ... |
| 3.61 | 147.7      | 2.57      | 146.3          | 2.39      | 100.5            | 1.87      | 118.3    | 4.41      | 161.1   | 3.70      | 98.0     | 2.92      | 102.6 | 3.85      | 92.0                  | ... |
| 31   | 17.9       | 50        | 15.6           | 1.80      | 15.6             | ...       | 6.8      | 80        | 19.0    | 49        | 11.7     | 97        | 10.6  | 26        | 11.3                  | ... |
| ...  | 16.1       | ...       | 12.6           | ...       | 12.6             | ...       | 14.8     | ...       | 17.5    | ...       | 21.4     | ...       | 16.3  | ...       | 27.2                  | ..  |
| ...  | 4.0        | ...       | 2.1            | ...       | 3.1              | ...       | 4.8      | ...       | 4.3     | ...       | 3.9      | ...       | 4.4   | ...       | 2.8                   | ... |
| ...  | 1.1        | ...       | ...            | ...       | 6                | ...       | ...      | ...       | 1.0     | ...       | ...      | ...       | 8     | ...       | ...                   | ... |
| 1.10 | 18.8       | 1.09      | 13.5           | 3.00      | 16.9             | 2.50      | 13.6     | 40        | 15.3    | 65        | 12.6     | 49        | 13.7  | 1.46      | 11.3                  | ... |
| ...  | 21.1       | ...       | 7.5            | ...       | 13.1             | ...       | 14.0     | ...       | 20.4    | ...       | 12.4     | ...       | 12.1  | ...       | 16.0                  | ... |
| ...  | ...        | ...       | ...            | ...       | ...              | ...       | ...      | ...       | 2       | ...       | ...      | ...       | ...   | ...       | ...                   | ... |
| 1.10 | 120.8      | 66        | 94.1           | 90        | 40.6             | ...       | 87.4     | 1.20      | 100.9   | 1.45      | 60.5     | 73        | 79.8  | 80        | 20.6                  | ... |
| 1.25 | 130.5      | 33        | 110.9          | 30        | 84.3             | ...       | 87.8     | 1.20      | 110.6   | 32        | 83.9     | ...       | 108.3 | 40        | 67.6                  | ... |
| ...  | 83.2       | 17        | 51.9           | ...       | 124.8            | ...       | 59.3     | 40        | 92.5    | 32        | 56.2     | ...       | 60.0  | ...       | 67.6                  | ... |
| ...  | 13.1       | ...       | 13.8           | ...       | 10.6             | ...       | 14.4     | ...       | 15.3    | ...       | 8.3      | ...       | 7.8   | ...       | 7.5                   | ... |
| 16   | 4.7        | 25        | 5.7            | ...       | 4.4              | ...       | 3.6      | ...       | 6.6     | 16        | 7.5      | 24        | 4.5   | 13        | 1.9                   | ... |
| ...  | 24.1       | ...       | 21.3           | ...       | 25.0             | ...       | 29.2     | ...       | 26.6    | ...       | 18.9     | ...       | 21.4  | ...       | 18.8                  | ... |
| ...  | 110.4      | ...       | 111.5          | ...       | 108.6            | ...       | 112.3    | ...       | 106.4   | ...       | 100.7    | ...       | 97.2  | ...       | 87.3                  | ... |
| ...  | 17.4       | ...       | 6.3            | ...       | 6.9              | ...       | 7.2      | ...       | 14.3    | ...       | 3.2      | ...       | 8.2   | 13        | 15.0                  | ... |
| ...  | 1.9        | ...       | 1.8            | ...       | 8.7              | ...       | 1.2      | ...       | 1.8     | ...       | 1.0      | ...       | 3.6   | ...       | ...                   | ... |
| ...  | ...        | ...       | ...            | ...       | ...              | ...       | ...      | ...       | ...     | ...       | ...      | ...       | ...   | ...       | ...                   | ... |
| 31   | 117.2      | 25        | 130.4          | 60        | 167.9            | 62        | 112.3    | ...       | 121.8   | 32        | 86.8     | 24        | 111.0 | 26        | 101.4                 | 94  |
| ...  | ...        | ...       | ...            | ...       | ...              | 62        | ...      | ...       | ...     | ...       | ...      | ...       | ...   | 13        | ...                   | ... |
| 63   | 1          | 17        | ...            | ...       | 6                | ...       | 4        | ...       | 5       | 48        | ...      | ...       | ...   | 13        | ...                   | ... |
| ...  | ...        | ...       | ...            | ...       | ...              | ...       | ...      | ...       | ...     | ...       | ...      | ...       | 7     | ...       | ...                   | ... |
| ...  | 2          | ...       | 3              | ...       | ...              | ...       | 4        | ...       | ...     | ...       | ...      | ...       | ...   | ...       | ...                   | ... |
| ...  | 2          | ...       | 1.8            | ...       | 1.2              | ...       | 8        | ...       | 1.1     | ...       | 1.0      | ...       | 9     | ...       | ...                   | ... |
| ...  | ...        | ...       | ...            | ...       | ...              | ...       | ...      | ...       | ...     | ...       | ...      | ...       | ...   | ...       | 6.6                   | ... |
| 8.63 | 884.4      | 6.40      | 807.0          | 9.89      | 789.0            | 6.23      | 718.7    | 9.61      | 880.2   | 8.53      | 610.6    | 6.32      | 701.0 | 7.68      | 584.0                 | 94  |

# REP

**GENERAL DISEASES.**—The *h* class, that of the Home District, corresponding rate of the same District decrease occurs in the *constitutive* is a relatively considerable increase.

The rates of admissions and shown in the following Tables :

| Districts ... ..           |                               |                             |          | Channel Isles. | Belfast.   | Dublin.    | Curragh.  | Cork.      | Mobilised Army Corps |           |       |
|----------------------------|-------------------------------|-----------------------------|----------|----------------|------------|------------|-----------|------------|----------------------|-----------|-------|
| Average Strength ... ..    |                               |                             |          | 1,602          | 2,494      | 6,213      | 4,112     | 7,533      | 1,065                |           |       |
| Class of Diseases.         |                               |                             |          | Admitted.      | Died.      | Admitted.  | Died.     | Admitted.  | Died.                | Admitted. | Died. |
| CLASS I.—GENERAL DISEASES. | Febrile Group.                | Eruptive Fevers ... ..      | 1 ...    | 10 ...         | 15 ...     | 2 ...      | 1 ...     | 23 ...     | 1 ...                | ...       | ...   |
|                            |                               | Continued „ ... ..          | 46 1     | 44 2           | 108 2      | 65 2       | 132 1     | 25 ...     | ...                  | ...       | ...   |
|                            |                               | Paroxysmal „ ... ..         | 20 ...   | 7 ...          | 21 ...     | 21 ...     | 28 ...    | 5 ...      | ...                  | ...       | ...   |
|                            |                               | Influenza ... ..            | ...      | 8 ...          | 106 ...    | ...        | 67 ...    | ...        | ...                  | ...       | ...   |
|                            |                               | Erysipelas ... ..           | 1 ...    | 4 ...          | 13 1       | 5 ...      | 11 ...    | ...        | ...                  | ...       | ...   |
|                            |                               | Other Diseases ... ..       | 1 ...    | 2 1            | 4 1        | ...        | 11 ...    | ...        | ...                  | ...       | ...   |
|                            | Total of Febrile Group        |                             |          | 69 1           | 75 3       | 267 4      | 93 3      | 272 1      | 31 ...               | ...       | ...   |
|                            | Constitutional Group.         | Rheumatism ... ..           | 41 ...   | 79 ...         | 286 ...    | 199 ...    | 271 1     | 24 ...     | ...                  | ...       | ...   |
|                            |                               | Syphilis ... ..             | 105 ...  | 167 ...        | 602 ...    | 142 1      | 384 ...   | 68 ...     | ...                  | ...       | ...   |
|                            |                               | Scrofula, Phthisis, &c. ... | 12 3     | 44 9           | 89 20      | 51 11      | 99 25     | 3 ...      | ...                  | ...       | ...   |
|                            |                               | Scurvy and Purpura ...      | 2 ...    | 1 1            | ...        | 1 ...      | 2 ...     | ...        | ...                  | ...       | ...   |
|                            |                               | Anæmia ... ..               | 1 ...    | 2 ...          | 3 1        | ...        | 4 ...     | 1 ...      | ...                  | ...       | ...   |
|                            |                               | Other Diseases ... ..       | ... ...  | 2 1            | 21 2       | 10 ...     | 13 3      | 2 ...      | ...                  | ...       | ...   |
|                            | Total of Constitutional Group |                             |          | 161 3          | 295 11     | 1,001 23   | 403 12    | 773 29     | 98 ...               | ...       | ...   |
| CLASS I.—GENERAL DISEASES. | Febrile Group.                | Eruptive Fevers ... ..      | ·6 ...   | 4·0 ...        | 2·4 ...    | ·5 ...     | ·24 ...   | 3·0 ...    | ·9 ...               | ...       | ...   |
|                            |                               | Continued „ ... ..          | 23·7     | ·62 17·6       | ·80 17·4   | ·33 15·8   | ·49 17·5  | ·13 23·5   | ...                  | ...       | ...   |
|                            |                               | Paroxysmal „ ... ..         | 12·5 ... | 2·8 ...        | 3·4 ...    | 5·1 ...    | 3·7 ...   | 4·7 ...    | ...                  | ...       | ...   |
|                            |                               | Influenza ... ..            | ...      | 3·2 ...        | 17·1 ...   | ...        | 8·9 ...   | ...        | ...                  | ...       | ...   |
|                            |                               | Erysipelas ... ..           | ·6 ...   | 1·6 ...        | 2·1 ...    | ·16 1·2    | 1·5 ...   | ...        | ...                  | ...       | ...   |
|                            |                               | Other Diseases ... ..       | ·6 ...   | ·8             | ·40        | ·6         | ·16       | 1·5        | ...                  | ...       | ...   |
|                            | Total of Febrile Group        |                             |          | 43·0           | ·62 30·0   | 1·20 43·0  | ·64 22·6  | ·73 36·1   | ·13 29·1             | ...       | ...   |
|                            | Constitutional Group.         | Rheumatism ... ..           | 25·6 ... | 31·7 ...       | 46·0 ...   | 48·4 ...   | 36·0 ...  | ·13 22·6   | ...                  | ...       | ...   |
|                            |                               | Syphilis ... ..             | 55·6 ... | 67·0 ...       | 96·9 ...   | 34·5       | ·24 51·0  | 63·8 ...   | ...                  | ...       | ...   |
|                            |                               | Scrofula, Phthisis, &c. ... | 7·5 1·87 | 17·6 3·61      | 14·3 3·22  | 12·4 2·67  | 13·1 3·32 | 2·8 ...    | ...                  | ...       | ...   |
|                            |                               | Scurvy and Purpura ...      | 1·2 ...  | ·4             | ·40        | ...        | ·3 ...    | ...        | ...                  | ...       | ...   |
|                            |                               | Anæmia ... ..               | ·6 ...   | ·8 ...         | ·5         | 16 ...     | ·5 ...    | ·9 ...     | ...                  | ...       | ...   |
|                            |                               | Other Diseases ... ..       | ... ...  | ·8             | ·40        | 3·4        | ·32 2·4   | 1·7 40     | 1·9 ...              | ...       | ...   |
|                            | Total of Constitutional Group |                             |          | 100·5          | 1·87 118·3 | 4·41 161 1 | 3·70 97·9 | 2 91 102·6 | 3·85 92·0            | ...       | ...   |

**Eruptive Fevers.**—For all Districts together the rate of prevalence of fevers of this nature (4·2 per 1,000 men) exceeds that of the preceding year by one-sixth; the increase is accounted for by the participation of the troops quartered in the Northern, and in the Chatham Districts, in the epidemic of small-pox which occurred during the year; the admissions for this fever were only 25, but the presence of the disease led to increased re-vaccination, and the admissions consequent on the operation augmented the proportional prevalence of the group of eruptive fevers. Scarlet fever prevailed less than in 1875, but admissions for it occurred in every District except the Channel Islands, and the North British, its greatest prevalence was in the Southern, and in the Woolwich Districts.

**Continued Fevers.**—For all Districts together, the rate of admissions for fevers of this nature is 2·4 per 1,000 men lower than in the preceding year, and the rate of mortality is ·06 per 1,000 lower.

**Typhus Fever.**—There were two admissions for this fever, one of which took place in the Southern, the other in the Belfast District; both attacks were fatal.

**Enteric Fever,** caused in all 93 admissions and 18 deaths. No District was quite free from the presence of this form of continued fever, but its prevalence differed widely, being in the proportion of 4·30 per 1,000 men in the Home, of 1·93 per 1,000 in the Dublin, and of only ·26 per 1,000 in the South-Eastern; the mortality from enteric fever, however, was not in proportion to its prevalence in the various Districts, no attack of this fever proved fatal in the Home District. No epidemic outbreak occurred at any station, though in a few instances two or three attacks followed in sequence; two-thirds of all those in the Home District, were amongst the troops in London, in the last quarter of the year.

**Simple Continued Fever.**—The prevalence of this fever in all Districts together is in the rate of 4·07 per 1,000 men, the greatest rate of prevalence is that of the Home District; the death from it was in the Cork District.

**Febricula.**—The rate of admissions (for all Districts 15·16 per 1,000 men) varies from 17·42 per 1,000 men in the Northern to 10·19 per 1,000 in the North British District.

**Paroxysmal Fevers.**—The rate of admissions for all Districts together shows a reduction of 1·0 per 1,000 men on the rate of the preceding year; as in it, so in the present year, Woolwich shows the highest rate of prevalence, 21·9 per 1,000 men, next to it the Chatham District, 20·0 per 1,000; the lowest rate is that of the Belfast District, 2·8 per 1,000.

**Influenza.**—The rates of admission for this form of fever in the various Districts vary greatly from those of the preceding year; that of the North British, is more than two-fold higher, that of Chatham, on the other hand, is fourteen times lower.

**Erysipelas.**—For all Districts together the rate of prevalence is 2·6 per 1,000 men (nearly one-third) lower than that for the preceding year; there is a large reduction in the rates for the Eastern, Western, South Eastern, and Woolwich Districts; the Aldershot, North British, and Chatham Districts have higher rates; the rate of the Home District is the same for both years.

**Rheumatism.**—For all Districts together the rate of admissions is 4·9 per 1,000 men lower than in the preceding year, and every District shows a reduced rate of prevalence of this affection except Chatham, for which there is an increase of 13·6 per 1,000 men.

**Syphilis.**—For all Districts together the rate of admissions is ·9 per 1,000 men lower than in the preceding year; for the primary form of the disease in the present year the rate of admissions is 46·0 per 1,000 men, for the constitutional form 27·4 per 1,000. Compared with 1875 the rates of admissions for syphilis (both forms together) are higher for the Northern, South-Eastern, Chatham, Aldershot, and North British Districts, and lower for the other Districts.

In continuation of the statistical information given in the reports of previous years, the admissions for primary venereal sores at certain large stations in the United Kingdom, and their rates per 1,000 of the mean strength, are shown in the following Tables:—



## Stations under the Act.

*United  
Kingdom.*

| Station                                 | Average Annual Strength. | Admitted for Primary Venereal Sores. | Admitted for Gonorrhœa. | Ratio per 1,000 of strength admitted for Primary Venereal Sores. | Ratio per 1,000 of strength admitted for Gonorrhœa. |
|-----------------------------------------|--------------------------|--------------------------------------|-------------------------|------------------------------------------------------------------|-----------------------------------------------------|
| Devonport and Plymouth                  | 2,658                    | 71                                   | 247                     | 27                                                               | 93                                                  |
| Portsmouth .. ..                        | 5,592                    | 151                                  | 385                     | 27                                                               | 69                                                  |
| Chatham, Sheerness, and Gravesend .. .. | 4,588                    | 151                                  | 282                     | 33                                                               | 61                                                  |
| Woolwich .. ..                          | 5,788                    | 241                                  | 470                     | 42                                                               | 81                                                  |
| Aldershot .. ..                         | 12,055                   | 563                                  | 901                     | 47                                                               | 75                                                  |
| Windsor .. ..                           | 956                      | 39                                   | 78                      | 41                                                               | 82                                                  |
| Shorncliffe .. ..                       | 2,748                    | 60                                   | 115                     | 22                                                               | 42                                                  |
| Colchester.. ..                         | 2,681                    | 80                                   | 190                     | 30                                                               | 72                                                  |
| Winchester .. ..                        | 983                      | 20                                   | 85                      | 20                                                               | 86                                                  |
| Dover .. ..                             | 2,478                    | 75                                   | 112                     | 30                                                               | 45                                                  |
| Canterbury .. ..                        | 1,408                    | 38                                   | 80                      | 27                                                               | 57                                                  |
| Maidstone.. ..                          | 108                      | 3                                    | 2                       | 28                                                               | 18                                                  |
| Cork .. ..                              | 2,520                    | 54                                   | 150                     | 21                                                               | 59                                                  |
| Curragh .. ..                           | 4,112                    | 76                                   | 205                     | 18                                                               | 50                                                  |
| Total of 14 Stations under the Act .. } | 48,620                   | 1,622                                | 3,802                   | 33                                                               | 68                                                  |

Stations *not* under the Act.

|                                                    |        |       |       |     |     |
|----------------------------------------------------|--------|-------|-------|-----|-----|
| Ile of Wight .. ..                                 | 1,139  | 61    | 73    | 54  | 64  |
| London .. ..                                       | 3,785  | 545   | 866   | 146 | 98  |
| Warley .. ..                                       | 824    | 42    | 79    | 51  | 96  |
| Hounslow.. ..                                      | 666    | 50    | 39    | 75  | 59  |
| Pembroke Dock .. ..                                | 972    | 28    | 47    | 29  | 48  |
| Sheffield .. ..                                    | 812    | 97    | 72    | 119 | 89  |
| Manchester .. ..                                   | 1,063  | 120   | 162   | 113 | 152 |
| Preston .. ..                                      | 819    | 63    | 86    | 77  | 105 |
| Edinburgh .. ..                                    | 1,155  | 103   | 86    | 89  | 74  |
| Fermoy .. ..                                       | 1,182  | 37    | 76    | 31  | 64  |
| Limerick .. ..                                     | 802    | 38    | 41    | 47  | 51  |
| Athlone .. ..                                      | 608    | 5     | 30    | 8   | 49  |
| Dublin .. ..                                       | 4,062  | 310   | 459   | 76  | 113 |
| Belfast .. ..                                      | 956    | 55    | 61    | 57  | 64  |
| Total of 14 Stations <i>not</i> under the Act .. } | 18,790 | 1,554 | 1,677 | 82  | 89  |

United  
Kingdom.

| Stations.                     | Rate of Admissions into Hospital per 1,000 of Mean<br>Strength for Primary Venereal Sores in— |       |       |       |       |       |       |       |       |       |
|-------------------------------|-----------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                               | 1867.                                                                                         | 1868. | 1869. | 1870. | 1871. | 1872. | 1873. | 1874. | 1875. | 1876. |
| Devonport and<br>Plymouth.. } | 76                                                                                            | 66    | 74    | 58    | 50    | 59    | 37    | 36    | 29    | 27    |
| Portsmouth ..                 | 116                                                                                           | 86    | 62    | 51    | 41    | 40    | 41    | 48    | 30    | 27    |
| Chatham and<br>Sheerness.. }  | 71                                                                                            | 63    | 41    | 47    | 65    | 49    | 41    | 33    | 17    | 33    |
| Woolwich ..                   | 88                                                                                            | 46    | 52    | 43    | 58    | 60    | 60    | 47    | 59    | 42    |
| Aldershot ..                  | 81                                                                                            | 77    | 63    | 67    | 65    | 62    | 72    | 52    | 46    | 47    |
| Windsor ..                    | 58                                                                                            | 136   | 93    | 67    | 78    | 96    | 84    | 63    | 41    | 41    |
| Shorncliffe ..                | 42                                                                                            | 77    | 60    | 100   | 30    | 33    | 21    | 14    | 18    | 22    |
| Colchester ..                 | 145                                                                                           | 182   | 85    | 42    | 32    | 55    | 42    | 20    | 32    | 30    |
| Winchester ..                 | 52                                                                                            | 104   | 101   | 61    | 29    | 57    | 27    | 38    | 27    | 20    |
| Dover ..                      | 132                                                                                           | 111   | 80    | 30    | 24    | 47    | 38    | 37    | 27    | 30    |
| Canterbury ..                 | 119                                                                                           | 114   | 45    | 152   | 38    | 43    | 20    | 36    | 12    | 27    |
| Maidstone ..                  | 242                                                                                           | 122   | 128   | 68    | 44    | 57    | 59    | 66    | 7     | 28    |
| Cork ..                       | 72                                                                                            | 61    | 73    | 68    | 55    | 62    | 61    | 26    | 21    | 21    |
| Curragh ..                    | 104                                                                                           | 85    | 88    | 56    | 35    | 50    | 30    | 46    | 35    | 18    |
| Isle of Wight ..              | 59                                                                                            | 103   | 129   | 64    | 66    | 57    | 37    | 89    | 89    | 54    |
| London ..                     | 163                                                                                           | 148   | 144   | 160   | 190   | 199   | 185   | 179   | 187   | 146   |
| Warley ..                     | 74                                                                                            | 92    | 61    | 55    | 57    | 66    | 22    | 32    | 37    | 52    |
| Hounslow ..                   | 62                                                                                            | 106   | 85    | 88    | 45    | 90    | 67    | 68    | 24    | 75    |
| Pembroke Dock                 | 28                                                                                            | 35    | 51    | 54    | 28    | 27    | 25    | 21    | 31    | 29    |
| Sheffield ..                  | 163                                                                                           | 107   | 146   | 77    | 126   | 98    | 71    | 49    | 87    | 119   |
| Manchester ..                 | 177                                                                                           | 115   | 160   | 92    | 70    | 98    | 91    | 106   | 89    | 113   |
| Preston ..                    | 87                                                                                            | 87    | 172   | 134   | 75    | 114   | 123   | 97    | 57    | 77    |
| Edinburgh ..                  | 63                                                                                            | 46    | 60    | 99    | 69    | 43    | 44    | 25    | 27    | 89    |
| Fermoy ..                     | 70                                                                                            | 47    | 116   | 89    | 33    | 56    | 21    | 10    | 12    | 31    |
| Limerick ..                   | 117                                                                                           | 114   | 54    | 136   | 57    | 100   | 78    | 58    | 25    | 47    |
| Athlone ..                    | 85                                                                                            | 38    | 42    | 44    | 47    | 14    | 14    | 8     | 10    | 8     |
| Dublin ..                     | 129                                                                                           | 139   | 180   | 128   | 117   | 165   | 136   | 95    | 73    | 76    |
| Belfast ..                    | 89                                                                                            | 56    | 52    | 43    | 61    | 78    | 103   | 64    | 44    | 57    |

\* Stoppage of pay in force.

The group of 14 stations under the Act shows a reduction of 2 per 1,000 *United* men, on the corresponding rate for the preceding year; the contrasted group of *Kingdom*. 14 stations, shows an increase of 3 per 1,000 men.

The results obtained by a different grouping of the stations in the United Kingdom, are shown in the following table:—

| Groups.                                                  | Average Annual Strength. | Admissions into Hospital for Primary Venereal Sores. | Rate per 1,000 of Strength of Admissions for Primary Venereal Sores. |
|----------------------------------------------------------|--------------------------|------------------------------------------------------|----------------------------------------------------------------------|
| The 14 Stations under the }<br>Contagious Diseases Act } | 48,620                   | 1,622                                                | 33                                                                   |
| All other Stations .. .. .                               | 28,073                   | 2,416                                                | 63                                                                   |

No admissions for this disease are returned at 14 stations, having an aggregate mean annual strength of 986 men.

*Scrofula and Phthisis.*—Compared with the preceding year the rate of admissions is higher for the Northern, Home, Aldershot, and Channel Islands Districts; for the Southern District the rate is the same in both years.

*LOCAL DISEASES.—Diseases of the Nervous System.*—Compared with the preceding year, the rate of admissions is higher for all Districts, excepting the Northern, Western, Chatham, South Eastern, and Woolwich; the highest rate, that of the Eastern, is double that for 1875, this is due to the comparatively large number of admissions for epilepsy, and for convulsions.

*Diseases of the Eye.*—For the most part the rates of admissions in the various Districts, are in close accordance with the corresponding ones for the preceding year; in both years the highest rate is that of the Eastern, and the lowest is that of the Home District. The greater comparative prevalence of conjunctivitis, in the first named District, accounts for its higher admission-rate.

*Diseases of the Circulatory System.*—The rate of admissions is higher than for the preceding year, in the Eastern, Western, Woolwich, and Channel Islands Districts; in the North British, it is the same for both years. The rate of admissions for palpitation is 7.1 per 1,000 of the strength for all Districts together, showing a reduction of .6 per 1,000 on the rate for the preceding year. The prevalence of this disorder varies from 8.7 per 1,000 men in the Aldershot to 1.7 per 1,000 in the North British.

*Diseases of the Respiratory System.*—As in the preceding year, the highest rate of prevalence is that for the Eastern District, which is nearly threefold greater than the rate of the Chatham District; the rates for the Eastern, Western, Aldershot, and North British Districts, exceed the corresponding ones for 1875. In the remaining Districts the rates are lower, in most instances much lower.

*Diseases of the Digestive System.*—Compared with 1875 the rates of admissions are lower in the Northern, Western, Chatham, South Eastern, Aldershot, and Channel Islands Districts.

*Diseases of the Urinary System.*—Compared with the preceding year there is a lower rate of admissions for diseases of this order in the Eastern, and in the South-Eastern Districts, and a higher one in each of the remaining Districts.

The admissions into hospital for gonorrhoea, at specified groups of stations in the United Kingdom, are shown in the following Table:—

United  
Kingdom.

| Groups.                                                                                                        | Average Annual<br>Strength<br>of the Group. | Admissions<br>into Hospital<br>for Gonorrhoea. | Rate per 1,000<br>of the Strength,<br>of Admissions<br>for Gonorrhoea. |
|----------------------------------------------------------------------------------------------------------------|---------------------------------------------|------------------------------------------------|------------------------------------------------------------------------|
| The 14 Stations under the<br>Contagious Diseases Act .. }                                                      | 48,620                                      | 3,302                                          | 68                                                                     |
| At 14 Large Stations not under<br>the Contagious Diseases Act.. }                                              | 18,790                                      | 1,677                                          | 89                                                                     |
| All Stations together not under<br>the Contagious Diseases Act<br>(including the 14 Large<br>Stations) .. .. } | 38,073                                      | 3,043                                          | 80                                                                     |

*Diseases of the Cutaneous System.*—Compared with the preceding year, the rates of admissions are higher for all Districts, excepting the South Eastern, Woolwich, and the Aldershot.

*Poisons.*—Compared with the admission rates for 1875, there is an increase in those for the Eastern, Western, Southern, South-Eastern, and Channel Islands Districts, a decrease in those for the Northern, Home, Woolwich, and for the Aldershot Districts, the rates of the Chatham, and of the North British Districts, are the same for both years. As in the preceding, so in the present year, the rate of the Woolwich District exceeds that of any other. Of the admissions for diseases in this class 138 were for delirium tremens, 134 for alcohol poisoning, and 4 for poisoning by other means.

*INJURIES.—Accidental.*—The rate of admissions is higher than in the preceding year for the Northern, Eastern, Chatham, Home, Aldershot, North British, and Channel Islands Districts, and lower for the Western, Southern, South-Eastern, and Woolwich Districts.

The admissions and deaths, and the number invalided in each arm of the service, with the rates per 1,000 of the strength, and the corresponding rates for the 10 years 1865–76, are shown in the following Table:—

# REPORT FOR 1876.

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United Kingdom.

| Arms of the Service.         | Average Strength. | Admitted into Hospital. | Died in and out of Hospital. | Discharged as Invalids. | Annual ratio per 1,000 of Strength. |       |            | 1868-75.—Annual Ratio per 1,000. |       |            |
|------------------------------|-------------------|-------------------------|------------------------------|-------------------------|-------------------------------------|-------|------------|----------------------------------|-------|------------|
|                              |                   |                         |                              |                         | Admitted.                           | Died. | Invalided. | Admitted.                        | Died. | Invalided. |
| Household Cavalry .. ..      | 1,205             | 798                     | 4                            | 20                      | 686.2                               | 3.32  | 16.70      | 614.5                            | 8.11  | 14.48      |
| Cavalry .. ..                | 10,639            | 9,413                   | 71                           | 354                     | 884.8                               | 6.67  | 33.27      | 769.8                            | 7.45  | 28.27      |
| Royal Artillery .. ..        | 12,468            | 9,941                   | 104                          | 291                     | 797.3                               | 8.34  | 23.34      | 869.7                            | 9.11  | 23.81      |
| Royal Engineers .. ..        | 3,583             | ..                      | 18                           | 50                      | ..                                  | 5.02  | 18.96      | ..                               | 6.74  | 13.89      |
| Foot Guards .. ..            | 5,349             | 4,345                   | 54                           | 106                     | 812.3                               | 10.09 | 19.82      | 718.1                            | 7.59  | 21.92      |
| Infantry Regiments .. ..     | 40,113            | 30,503                  | 311                          | 972                     | 760.4                               | 7.75  | 24.23      | 722.1                            | 8.00  | 25.16      |
| Depôt Brigade, R.A. .. ..    | 2,450             | 2,775                   | 19                           | 79                      | 1132.7                              | 7.76  | 32.25      | 1085.0                           | 9.15  | 36.12      |
| Coast Brigade, R.A. .. ..    | 1,568             | ..                      | 29                           | 6                       | ..                                  | 18.49 | 3.82       | ..                               | 18.13 | 8.23       |
| Depôts and Brigade Depôts .. | 9,358             | 7,780                   | 122                          | 418                     | 842.1                               | 13.04 | 43.51      | 894.4                            | 11.75 | 44.29      |
| Army Service Corps .. ..     | 2,846             | ..                      | 24                           | 39                      | ..                                  | 8.43  | 13.70      | ..                               | 9.78  | 12.97      |
| Army Hospital " .. ..        | 1,036             | ..                      | 13                           | 21                      | ..                                  | 12.65 | 20.27      | ..                               | 14.45 | 15.50      |

United  
Kingdom.

Compared with the preceding year, the rate of admissions is lower for every arm except Household Cavalry, in which there is an increase of 26·7 per 1,000 men, Infantry, in which it is 8·4 per 1,000, and Dépôt Brigade Royal Artillery, in which there is an increase of 21·2 per 1,000. The reduction in the rate of admissions for Cavalry is 22·1; for Royal Artillery, 48·4; for Foot Guards, 44·6; and for Dépôts, 63·9. The death-rate is lower than in the preceding year for every arm excepting Cavalry, in the rate of which there is an increase of ·32 per 1,000 men; Foot Guards, in which there is an increase of 2·37 per 1,000; Dépôt Brigade Royal Artillery, in which there is an increase of 1·33 per 1,000; and Coast Brigade Royal Artillery, in which there is an increase of ·79. The reduction on the death-rate of the preceding year for Household Cavalry is 4·15 per 1,000 men, for Royal Artillery is 1·67, for Royal Engineers is 5·5, for Infantry is 1·15, for Army Service Corps is ·33, and for Army Hospital Corps is 3·59 per 1,000 men. In the last-named arm a high death-rate is a permanent feature, that of the present year does not differ greatly from the average of ten years, the explanation is perhaps to be found partly in the exposure to infectious sickness entailed on the men by the nature of their duties, partly in the relatively small amount of invaliding, and partly in the composition of the arm as to the ages of its members. Compared with the preceding year, the rate of invaliding is higher for Household Cavalry by 10·89 per 1,000 men, for Cavalry by 4·49, for Royal Artillery and Foot Guards fractionally, for Army Service Corps, 5·31, and for Army Hospital Corps, 6·97. There is a decrease on the rate of invaliding of Royal Engineers of 3·78 per 1,000 men; for Infantry, 1·90; for Dépôt Brigade Royal Artillery, 20·53; for Coast Brigade Royal Artillery, 10·33; and for Dépôts, 10·13.

In the following Table, to the strength of each arm one-half of the number of men belonging to it who were placed on the pension list during the year has been added, and to the mortality of the arm the deaths occurring before the 31st of December among the men pensioned from it:—

|                            | 1876.                                 |                                    |                                            | 1866-75.                                                              |
|----------------------------|---------------------------------------|------------------------------------|--------------------------------------------|-----------------------------------------------------------------------|
|                            | Average Strength, corrected as above. | Deaths of Soldiers and Pensioners. | Ratio of Deaths per 1,000 of the Strength. | Ratio of Deaths of Soldiers and Pensioners per 1,000 of the Strength. |
| Household Cavalry .. .. .  | 1,229                                 | 6                                  | 4·88                                       | 10·01                                                                 |
| Cavalry .. .. .            | 10,901                                | 79                                 | 7·25                                       | 8·49                                                                  |
| Royal Artillery .. .. .    | 13,215                                | 126                                | 9·53                                       | 10·18                                                                 |
| Foot Guards .. .. .        | 5,514                                 | 59                                 | 10·70                                      | 9·45                                                                  |
| Infantry Regiments .. .. . | 40,986                                | 333                                | 8·12                                       | 9·06                                                                  |

Compared with 1875 a higher death-rate of soldiers and pensioners combined, is seen in the instance of Cavalry and Foot Guards, a lower rate in that of each of the other arms.

The classes and orders of diseases by which the admissions, deaths, and invaliding in each arm of the service were caused, are shown in the following Tables:—

| Order. |                                 |          | Royal Engineers. |          | Coast Brigade, R. A. |          | Army Hospital Corps. |          | Army Service Corps. |          |
|--------|---------------------------------|----------|------------------|----------|----------------------|----------|----------------------|----------|---------------------|----------|
|        | Strength ... ..                 |          | 3,583            |          | 1,568                |          | 1,036                |          | 2,846               |          |
|        | Class of Diseases.              | Invalid. | Died.            | Invalid. | Died.                | Invalid. | Died.                | Invalid. | Died.               | Invalid. |
|        | <b>I. General Diseases.</b>     |          |                  |          |                      |          |                      |          |                     |          |
| 1      | Febrile Group... ..             | 1        | 1                | ...      | ...                  | ...      | ...                  | ...      | 1                   | ...      |
| 2      | Constitutional Group ... ..     | 116      | 9                | 12       | 9                    | 1        | 6                    | 7        | 10                  | 15       |
|        | <b>II. Local Diseases.</b>      |          |                  |          |                      |          |                      |          |                     |          |
|        | <b>Diseases of the—</b>         |          |                  |          |                      |          |                      |          |                     |          |
| 1      | Nervous System ... ..           | 44       | 2                | 7        | 2                    | 1        | 1                    | 2        | 2                   | 3        |
| 2      | Eye ... ..                      | 16       | ...              | 3        | ...                  | 1        | ...                  | ...      | ...                 | ...      |
| 3      | Ear ... ..                      | 8        | ...              | ...      | ...                  | ...      | ...                  | ...      | ...                 | ...      |
| 4      | Nose ... ..                     | ...      | ...              | ...      | ...                  | ...      | ...                  | ...      | ...                 | ...      |
| 5      | Circulatory System ... ..       | 73       | 3                | 16       | 10                   | 1        | 3                    | 2        | 6                   | 7        |
| 6      | Absorbent „ ... ..              | 1        | ...              | ...      | ...                  | ...      | ...                  | ...      | ...                 | ...      |
| 7      | Ductless Glands ... ..          | 1        | ...              | ...      | ...                  | ...      | ...                  | ...      | ...                 | ...      |
| 8      | Respiratory System ... ..       | 21       | 1                | 6        | 4                    | 1        | ...                  | 3        | 1                   | 6        |
| 9      | Digestive „ ... ..              | 45       | ...              | ...      | 1                    | ...      | 2                    | 2        | 1                   | 2        |
| 10     | Urinary „ ... ..                | 5        | ...              | 3        | 1                    | ...      | ...                  | ...      | 1                   | ...      |
| 11     | Generative „ ... ..             | 3        | ...              | ...      | ...                  | ...      | ...                  | ...      | ...                 | 1        |
| 12     | Organs of Locomotion ... ..     | 20       | ...              | 1        | ...                  | ...      | ...                  | ...      | 1                   | ...      |
| 13     | Cellular Tissue ... ..          | 2        | ...              | ...      | ...                  | ...      | ...                  | ...      | ...                 | 1        |
| 14     | Cutaneous System ... ..         | 5        | ...              | ...      | ...                  | 1        | ...                  | 1        | ...                 | ...      |
|        | <b>III. Conditions, &amp;c.</b> |          |                  |          |                      |          |                      |          |                     |          |
|        | Debility ... ..                 | 46       | ...              | 1        | ...                  | ...      | ...                  | 3        | ...                 | 3        |
|        | <b>IV. Poisons</b>              | ...      | ...              | ...      | ...                  | ...      | ...                  | ...      | ...                 | ...      |
|        | <b>V. Injuries.</b>             |          |                  |          |                      |          |                      |          |                     |          |
| 1      | Battle ... ..                   | ...      | ...              | ...      | ...                  | ...      | ...                  | ...      | ...                 | ...      |
| 2      | Accidental ... ..               | 10       | 2                | 1        | 1                    | ...      | 1                    | 1        | ...                 | 1        |
| 3      | Homicidal ... ..                | ...      | ...              | ...      | ...                  | ...      | ...                  | ...      | ...                 | ...      |
| 4      | Self-inflicted .. ...           | ...      | ...              | ...      | 1                    | ...      | ...                  | ...      | 1                   | ...      |
| 5      | Judicial ... ..                 | 1        | ...              | ...      | ...                  | ...      | ...                  | ...      | ...                 | ...      |
|        | <b>VI. Surgical Operations</b>  | ...      | ...              | ...      | ...                  | ...      | ...                  | ...      | ...                 | ...      |
|        | No appreciable disease          | ...      | ...              | ...      | ...                  | ...      | ...                  | ...      | ...                 | ...      |
|        | Cause unknown ... ..            | ...      | ...              | ...      | ...                  | ...      | ...                  | ...      | ...                 | ...      |
|        | <b>Total ... ..</b>             | 418      | 18               | 50       | 29                   | 6        | 1                    | 21       | 24                  | 39       |

ogth.

United  
Kingdom.

| Regiments. |            | Depôt Brigade,<br>Royal Artillery. |       |            | Depôts.   |       |            | Royal<br>Engineer. |            | Coast<br>Brigade,<br>R.A. |            | Army<br>Hospital<br>Corps. |            | Army<br>Service<br>Corps. |            |
|------------|------------|------------------------------------|-------|------------|-----------|-------|------------|--------------------|------------|---------------------------|------------|----------------------------|------------|---------------------------|------------|
| Died.      | Invalided. | Admitted.                          | Died. | Invalided. | Admitted. | Died. | Invalided. | Died.              | Invalided. | Died.                     | Invalided. | Died.                      | Invalided. | Died.                     | Invalided. |
| 60         | ...        | 84.9                               | ...   | ...        | 46.4      | 54    | 11         | 28                 | ...        | ...                       | ...        | ...                        | ...        | 35                        | ...        |
| 72         | 7.03       | 148.2                              | 3.67  | 5.71       | 117.9     | 5.13  | 12.40      | 2.51               | 3.34       | 5.74                      | 64         | 5.79                       | 6.76       | 3.51                      | 5.27       |
| 52         | 3.14       | 12.6                               | 82    | 3.67       | 19.2      | 1.07  | 4.70       | 56                 | 1.95       | 1.27                      | 64         | 97                         | 1.93       | 71                        | 1.03       |
| ...        | 95         | 13.5                               | ...   | 1.22       | 17.1      | ...   | 1.71       | ...                | 83         | ...                       | 64         | ...                        | ...        | ...                       | ...        |
| ...        | 30         | 7.3                                | ...   | 82         | 4.7       | ...   | 85         | ...                | ...        | ...                       | ...        | ...                        | ...        | ...                       | ...        |
| ...        | 02         | 2.0                                | ...   | ...        | 6         | ...   | ...        | ...                | ...        | ...                       | ...        | ...                        | ...        | ...                       | ...        |
| 1.22       | 4.34       | 12.2                               | 41    | 6.94       | 19.5      | 2.03  | 7.80       | 83                 | 4.49       | 6.37                      | 64         | 2.90                       | 1.93       | 2.11                      | 2.46       |
| ...        | 05         | 8.2                                | ...   | ...        | 14.6      | ...   | 11         | ...                | ...        | ...                       | ...        | ...                        | ...        | ...                       | ...        |
| ...        | ...        | ...                                | ...   | ...        | ...       | ...   | 11         | ...                | ...        | ...                       | ...        | ...                        | ...        | ...                       | ...        |
| 1.00       | 1.87       | 92.6                               | 1.63  | 41         | 91.6      | 1.82  | 2.24       | 28                 | 1.67       | 2.55                      | 64         | ...                        | 2.90       | 35                        | 2.11       |
| 45         | 1.12       | 193.0                              | ...   | 4.49       | 134.3     | 85    | 4.81       | ...                | ...        | 64                        | ...        | 1.93                       | 1.93       | 35                        | 7.1        |
| 25         | 30         | 110.6                              | 41    | ...        | 82.9      | 43    | 53         | ...                | 83         | 64                        | ...        | ...                        | ...        | 35                        | ...        |
| ...        | 05         | 10.6                               | ...   | 82         | 9.0       | ...   | 32         | ...                | ...        | ...                       | ...        | ...                        | ...        | ...                       | 85         |
| 12         | 90         | 8.2                                | 41    | 4.08       | 5.0       | ...   | 2.14       | ...                | 28         | ...                       | ...        | ...                        | ...        | 35                        | ...        |
| 05         | 15         | 26.9                               | ...   | 41         | 19.2      | ...   | 21         | ...                | ...        | ...                       | ...        | ...                        | ...        | ...                       | 35         |
| ...        | 30         | 208.2                              | ...   | 82         | 119.1     | ...   | 53         | ...                | ...        | ...                       | 64         | ...                        | 96         | ...                       | ...        |
| ...        | 2.96       | 10.2                               | ...   | 1.63       | 15.1      | ...   | 4.92       | ...                | 28         | ...                       | ...        | ...                        | 2.90       | ...                       | 1.05       |
| 03         | ...        | 4.1                                | ...   | ...        | 2.1       | ...   | ...        | ...                | ...        | ...                       | ...        | ...                        | ...        | ...                       | ...        |
| ...        | ...        | ...                                | ...   | ...        | 6         | ...   | ...        | ...                | ...        | ...                       | ...        | ...                        | ...        | ...                       | ...        |
| 55         | 65         | 166.1                              | 41    | 82         | 109.7     | 85    | 1.07       | 56                 | 28         | 64                        | ...        | 97                         | 96         | ...                       | 35         |
| 07         | ...        | ...                                | ...   | ...        | ...       | ...   | ...        | ...                | ...        | ...                       | ...        | ...                        | ...        | ...                       | ...        |
| 17         | 05         | ...                                | ...   | ...        | ...       | 21    | ...        | ...                | ...        | 64                        | ...        | ...                        | ...        | 35                        | ...        |
| ...        | ...        | 4                                  | ...   | 41         | ...       | ...   | 11         | ...                | ...        | ...                       | ...        | ...                        | ...        | ...                       | ...        |
| ...        | 05         | ...                                | ...   | ...        | ...       | ...   | ...        | ...                | ...        | ...                       | ...        | ...                        | ...        | ...                       | ...        |
| ...        | ...        | 7.8                                | ...   | ...        | 2.8       | ...   | ...        | ...                | ...        | ...                       | ...        | ...                        | ...        | ...                       | ...        |
| ...        | ...        | ...                                | ...   | ...        | ...       | 11    | ...        | ...                | ...        | ...                       | ...        | ...                        | ...        | ...                       | ...        |
| 7.75       | 24.23      | 1132.6                             | 7.76  | 32.25      | 831.4     | 13.04 | 44.67      | 5.02               | 13.95      | 13.49                     | 3.84       | 12.56                      | 20.27      | 8.43                      | 13.71      |



|                                      | Infantry<br>Regiments. | Depôt Brigade,<br>Royal Artillery. |           | Depôts. |           |       |
|--------------------------------------|------------------------|------------------------------------|-----------|---------|-----------|-------|
| Strength .. .. .                     | 40,113                 | 2,450                              |           | 9,358   |           |       |
| <b>General</b>                       | Limited.               | Died.                              | Admitted. | Died.   | Admitted. | Died. |
| <i>Febrile—</i>                      |                        |                                    |           |         |           |       |
| Eruptive Fevers .. .. .              | 145                    | 5                                  | 58        | ..      | 62        | ..    |
| Continued „ .. .. .                  | 725                    | 10                                 | 53        | ..      | 177       | 4     |
| Paroxysmal „ .. .. .                 | 189                    | ..                                 | 73        | ..      | 131       | ..    |
| Influenza .. .. .                    | 266                    | ..                                 | 20        | ..      | 32        | ..    |
| Erysipelas .. .. .                   | 61                     | 4                                  | 3         | ..      | 11        | 1     |
| Other Febrile Diseases ..            | 48                     | 5                                  | 1         | ..      | 21        | ..    |
| <b>Total of Febrile Group</b>        | 434                    | 24                                 | 208       | ..      | 434       | 5     |
| <i>Constitutional—</i>               |                        |                                    |           |         |           |       |
| Rheumatism .. .. .                   | 764                    | 1                                  | 123       | ..      | 416       | ..    |
| Syphilis .. .. .                     | 638                    | 3                                  | 213       | ..      | 501       | ..    |
| Scrofula, Phthisis, &c. ..           | 485                    | 97                                 | 24        | 7       | 151       | 46    |
| Scurvy and Purpura .. ..             | 12                     | 2                                  | 1         | 1       | ..        | ..    |
| Anæmia .. .. .                       | 21                     | ..                                 | 1         | ..      | 21        | ..    |
| Other Constitutional Diseases        | 34                     | 6                                  | 1         | 1       | 14        | 2     |
| <b>Total of Constitutional Group</b> | 1954                   | 109                                | 363       | 9       | 1,103     | 48    |

Strength.

|                                      |     |      |       |      |       |      |
|--------------------------------------|-----|------|-------|------|-------|------|
| <i>Febrile—</i>                      |     |      |       |      |       |      |
| Eruptive Fevers .. ..                | 3·6 | ·12  | 23·6  | ..   | 6·6   | ..   |
| Continued „ .. ..                    | 8·1 | ·25  | 21·7  | ..   | 18·9  | ·43  |
| Paroxysmal „ .. ..                   | 4·7 | ..   | 29·8  | ..   | 14·0  | ..   |
| Influenza .. .. .                    | 6·6 | ..   | 8·2   | ..   | 3·4   | ..   |
| Erysipelas .. .. .                   | 1·5 | ·10  | 1·2   | ..   | 1·2   | ·11  |
| Other Febrile Diseases ..            | 1·2 | ·12  | ·4    | ..   | 2·2   | ..   |
| <b>Total of Febrile Group</b>        | 5·7 | ·59  | 84·9  | ..   | 46·3  | ·54  |
| <i>Constitutional—</i>               |     |      |       |      |       |      |
| Rheumatism .. .. .                   | 4·0 | ·03  | 50·3  | ..   | 44·5  | ..   |
| Syphilis .. .. .                     | 5·8 | ·07  | 86·9  | ..   | 53·5  | ..   |
| Scrofula, Phthisis, &c. ..           | 2·1 | 2·42 | 9·8   | 2·85 | 16·1  | 4·92 |
| Scurvy and Purpura .. ..             | ·3  | ·05  | ·4    | ·41  | ..    | ..   |
| Anæmia .. .. .                       | ·5  | ..   | ·4    | ..   | 2·2   | ..   |
| Other Constitutional Diseases        | ·8  | ·15  | ·4    | ·41  | 1·6   | ·21  |
| <b>Total of Constitutional Group</b> | 8·5 | 2·72 | 148·2 | 3·67 | 117·8 | 5·13 |

**Eruptive Fevers.**—Compared with the preceding year the rate of admissions for fevers of this nature is lower for Household Cavalry, Cavalry, and Depôts, and is higher for each of the other arms given in the Table, the rate of the Depot Brigade Royal Artillery is nearly two-fold greater.

**Continued Fevers.**—Compared with the preceding year the rate of admissions is higher for Household Cavalry, Cavalry, and Foot Guards, in the instance of the last-named nearly one-third higher; the rate is lower for each of the other arms, and in each considerably so.

**Paroxysmal Fevers.**—The rate of admissions is lower than in the preceding year for every arm, except Royal Artillery, and Depot Brigade Royal Artillery, and Depôts.

**Erysipelas.**—The rate of admissions is lower than in the preceding year for every arm excepting Foot Guards, the excess of which is '7 per 1,000 men; the rate for Cavalry is the same in both years.

**Rheumatism.**—Excepting in the instance of Foot Guards, in which there is an increase of 4·5 per 1,000 men, the rate of admissions is lower for every arm than in the preceding year, materially lower in most of them.

**Syphilis.**—Compared with the preceding year the rate of admissions is lower for Household Cavalry, Foot Guards, and Depot Brigade Royal Artillery, but higher for each of the other arms; the reduction in the instance of Foot Guards is 42·1 per 1,000 men.

**Scrofula, Phthisis, &c.**—Compared with the preceding year the rate of admissions for diseases of this nature is higher for Household Cavalry by 5 per 1,000 men, for Royal Artillery by 1·4, for Foot Guards by 2', and for Infantry by '3. On the other hand, the rate of Cavalry is '9, that of Depot Brigade Royal Artillery, is 1·7, and that of Depôts is 5' per 1,000 men lower.

As the rates of mortality from diseases in this group are particularly likely to be affected by the comparative amount of invaliding on account of them, the proportions of loss from death and invaliding combined, are shown in the following Table:—

|                                     | Loss per 1,000<br>Men by Deaths<br>and Invaliding<br>combined, from<br>Scrofula and<br>Phthisis. |
|-------------------------------------|--------------------------------------------------------------------------------------------------|
| Household Cavalry .. .. .           | 9·96                                                                                             |
| Cavalry .. .. .                     | 6·11                                                                                             |
| Royal Artillery .. .. .             | 8·42                                                                                             |
| Foot Guards.. .. .                  | 18·09                                                                                            |
| Infantry .. .. .                    | 6·33                                                                                             |
| Depôt Brigade Royal Artillery .. .. | 5·71                                                                                             |
| Depôts .. .. .                      | 21·05                                                                                            |

Compared with the preceding year a higher rate of loss from scrofula and phthisis, &c., is shown for every arm except Infantry, but the gain in this respect is more than balanced by the very large increase, 8·09 per 1,000 men, in the rate for Depôts.

**LOCAL DISEASES.**—*Diseases of the Nervous System.*—In a comparison between the results of the present and of the preceding year, in respect of admissions for diseases of this order, the most noticeable feature is that of the evenness of the rates for the various arms in the two years, omitting from the comparison those the strength of which is considerable; thus the rates for Royal Artillery, Infantry, and for Depôts, differ only fractionally, whilst those

for Cavalry, and for Foot Guards, are not materially different ; there is however a large decrease, 10·8 per 1,000 men, in the rate for *Depôt Brigade Royal Artillery*. *United Kingdom.*

*Diseases of the Eye.*—Compared with the preceding year, there is a reduction on the rate for Household Cavalry, Foot Guards, Infantry, and for *Depôts* ; each of the other arms shows an increase, but in no instance a large one.

*Diseases of the Circulatory System.*—Compared with the preceding year, the rate of admissions is lower for every arm, excepting Household Cavalry, the rate for which is the same in both years ; for Royal Artillery the reduction is fractional only, but for each of the other arms it is important, being for Cavalry, 3·9, for Foot Guards and Infantry, 2·1, for *Depôt Brigade Royal Artillery*, 13·9, and for *Depôts*, 9·1 per 1,000 of the strength respectively.

*Diseases of the Respiratory System.*—There is an important reduction in the rate of every arm on that of the preceding year, excepting in *Depôt Brigade Royal Artillery*, which shows an increase of 7·7 per 1,000 men.

*Diseases of the Digestive System.*—Compared with the preceding year, there is a reduction in the rate of admissions for every arm excepting Foot Guards and *Depôt Brigade Royal Artillery* ; the increase for the first named is 15·0, and that for the latter is 34·0 per 1,000 men.

*Diseases of the Urinary System.*—The rate of admissions for diseases of this order is higher than that for the preceding year for Household Cavalry, Royal Artillery, Foot Guards, Infantry, and for *Depôts*.

*INJURIES.—Accidental.*—The rate of admissions for accidental injuries is higher than that of 1875 for Cavalry, and for Infantry, but is lower for each of the other arms.

The admissions, deaths, invaliding, and the number of daily sick in each corps which served in the United Kingdom in 1876, are shown in the following Table :—

United  
Kingdom.

| Regiments,<br>&c.                  | Average Annual<br>Strength. | Admitted into<br>Hospital. | Died.        |                     |        | Average Number<br>Daily Sick. | Annual Ratio per 1,000 of<br>Strength. |       |            |             | Average duration<br>of each Case of<br>Sickness. | Stations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------|-----------------------------|----------------------------|--------------|---------------------|--------|-------------------------------|----------------------------------------|-------|------------|-------------|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                    |                             |                            | In Hospital. | Out of<br>Hospital. | Total. |                               | Admitted.                              | Died. | Invalided. | Daily sick. |                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 1st Life Gds.                      | 400                         | 236                        | 1            | ..                  | 1      | 7                             | 588.5                                  | 2.49  | 17.45      | 25.41       | Days.<br>9.30                                    | London; det. at Hampton Court.<br>London, Windsor, Camp of Exercise.<br>Windsor, London.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 2nd "                              | 407                         | 221                        | 1            | 1                   | 2      | 10                            | 543.0                                  | 4.91  | 24.57      | 25.87       | 15.76                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| R. Horse Gds.                      | 398                         | 341                        | ..           | 1                   | 1      | 3                             | 856.8                                  | 2.51  | 7.54       | 31.58       | 17.39                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Total of<br>Household<br>Cavalry } | 1,205                       | 798                        | 2            | 2                   | 4      | 20                            | 666.2                                  | 3.32  | 16.70      | 27.71       | 13.56                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                    |                             |                            |              |                     |        |                               |                                        |       |            |             | 15.27                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 1st Dn. Gds.                       | 598                         | 517                        | 3            | 1                   | 4      | 14                            | 864.5                                  | 6.69  | 23.41      | 41.47       | Days.<br>15.13                                   | { Edinburgh and Manchester; dets. at Hamil-<br>ton, Liverpool, and Bury.<br>Newbridge, Curragh, and Cahir; dets. at<br>Fethard, Waterford, &c.<br>Longford, Curragh, and Dublin; dets. at<br>Athlone, Cavan, Carlow, &c.<br>Dublin, Dundalk, dets. at Belfast and Bel-<br>turbet.<br>Cahir and Ballinacollig; dets. at Waterford,<br>Cork, Fermoy, &c.<br>Norwich and York; dets. at Ipswich and<br>Colchester.<br>Ballinacollig and Newbridge; dets. at Cork,<br>Limerick, Curragh, &c.<br>York and Norwich; dets. at Ipswich and at<br>Colchester.<br>Brighton, Leeds, and Camp of Exercise;<br>dets. at Woolwich, &c. |
| 2nd "                              | 505                         | 323                        | 6            | ..                  | 6      | 6                             | 639.6                                  | 11.88 | 11.88      | 30.20       | 17.51                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 3rd "                              | 519                         | 408                        | ..           | ..                  | ..     | 23                            | 786.1                                  | ..    | 44.31      | 39.79       | 17.23                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 4th "                              | 615                         | 371                        | 5            | ..                  | 5      | 10                            | 603.2                                  | 8.13  | 16.26      | 28.86       | 18.47                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 5th "                              | 606                         | 413                        | 1            | ..                  | 1      | 4                             | 681.5                                  | 1.65  | 6.60       | 23.27       | 17.47                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 6th "                              | 605                         | 662                        | ..           | 1                   | 1      | 27                            | 1094.2                                 | 1.65  | 44.63      | 52.26       | 12.46                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 7th "                              | 504                         | 263                        | 4            | 2                   | 6      | 14                            | 521.6                                  | 11.90 | 27.78      | 22.83       | 17.43                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 1st Dragoons                       | 615                         | 458                        | 6            | 1                   | 7      | 13                            | 744.8                                  | 11.38 | 21.14      | 40.32       | 16.00                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 2nd "                              | 600                         | 583                        | 6            | 4                   | 10     | 9                             | 971.7                                  | 16.66 | 15.00      | 56.53       | 19.74                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|                                    |                             |                            |              |                     |        |                               |                                        |       |            |             | 21.24                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

# REPORT FOR 1876.

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United Kingdom.

| Regiments,<br>&c.                  | Average Annual<br>Strength. | Admitted into<br>Hospital. | Died.        |                     |        | Average number<br>daily sick. | Annual Ratio per 1,000 of<br>strength. |       |            |             | Average sick time<br>to each soldier. | Average duration<br>of each case of<br>sickness. | Stations.                                                            |
|------------------------------------|-----------------------------|----------------------------|--------------|---------------------|--------|-------------------------------|----------------------------------------|-------|------------|-------------|---------------------------------------|--------------------------------------------------|----------------------------------------------------------------------|
|                                    |                             |                            | In Hospital. | Out of<br>Hospital. | Total. |                               | Admitted.                              | Died. | Invalided. | Daily sick. |                                       |                                                  |                                                                      |
| 5th Lancers                        | 526                         | 515                        | 2            | ..                  | 2      | 21.54                         | 979.1                                  | 3.80  | 72.24      | 40.95       | 14.95                                 | 15.27                                            | Aldershot, Camp of Exercise.                                         |
| 6th Dragoons                       | 523                         | 456                        | 4            | ..                  | 4      | 23.27                         | 871.9                                  | 7.65  | 19.12      | 44.49       | 16.24                                 | 18.63                                            | { Dundalk and Dublin; deta. at Belfast and<br>Belurbet.              |
| 7th Hussars                        | 517                         | 550                        | 3            | 2                   | 5      | 28.00                         | 1063.8                                 | 9.67  | 50.29      | 54.16       | 19.77                                 | 18.58                                            | { Manchester, Edinburgh; deta. at Liverpool,<br>and at Hamilton.     |
| 8th "                              | 606                         | 565                        | ..           | ..                  | ..     | 21.02                         | 932.2                                  | ..    | 33.00      | 34.69       | 12.66                                 | 13.58                                            | Aldershot.                                                           |
| 12th Lancers                       | 605                         | 474                        | 2            | 1                   | 3      | 23.51                         | 783.5                                  | 4.96  | 61.24      | 37.21       | 14.67                                 | 18.73                                            | Shorncliffe.                                                         |
| 17th "                             | 613                         | 783                        | 3            | ..                  | 3      | 34.43                         | 1277.3                                 | 4.89  | 14.68      | 56.17       | 20.50                                 | 16.06                                            | Dublin, Aldershot, Camp of Exercise.                                 |
| 18th Hussars                       | 502                         | 737                        | 3            | ..                  | 3      | 34.50                         | 1468.1                                 | 5.98  | 133.47     | 68.72       | 25.10                                 | 17.09                                            | Colchester.                                                          |
| 19th "                             | 503                         | 355                        | 2            | 1                   | 3      | 18.62                         | 705.8                                  | 5.96  | 21.87      | 37.02       | 13.51                                 | 19.14                                            | { Leeds, Longford, and Curragh; deta. at<br>Bury, Preston, Gort, &c. |
| 20th "                             | 516                         | 465                        | 3            | ..                  | 3      | 21.66                         | 901.2                                  | 5.81  | 25.19      | 41.97       | 15.32                                 | 17.00                                            | { Hounslow, Brighton; det. at Hil-<br>sea.                           |
| 21st "                             | 513                         | 500                        | 3            | 2                   | 5      | 25.77                         | 974.6                                  | 9.74  | 17.54      | 50.23       | 18.33                                 | 18.81                                            | { Aldershot, Hounslow; det. at Ken-<br>sington.                      |
| Riding Estab-<br>lishment          | 48                          | 15                         | ..           | ..                  | ..     | .79                           | 312.5                                  | ..    | ..         | 16.46       | 6.01                                  | 19.22                                            | Canterbury.                                                          |
| Total<br>of Cavalry<br>of the Line | 10,639                      | 9,413                      | 56           | 15                  | 71     | 446.50                        | 884.8                                  | 6.67  | 33.27      | 41.97       | 15.32                                 | 17.31                                            |                                                                      |

\* From 19th January to 31st December.

United  
Kingdom.

| Regiments, &c.                   | Average Annual Strength. | Admitted into Hospital. | Died.        |                  | Invalided. | Average Number daily Sick. | Annual Ratio per 1,000 of Strength. |       |            |             | Average Sick-time to each Soldier. | Average Duration of each case of Sickness. |
|----------------------------------|--------------------------|-------------------------|--------------|------------------|------------|----------------------------|-------------------------------------|-------|------------|-------------|------------------------------------|--------------------------------------------|
|                                  |                          |                         | In Hospital. | Out of Hospital. |            |                            | Admitted.                           | Died. | Invalided. | Daily Sick. |                                    |                                            |
| A Brigade, Royal Horse Artillery | 26                       | 33                      | 1            | 1                | 1          | 91                         | 1269.2                              | 38.46 | ..         | 35.00       | 12.77                              | 10.07                                      |
| B " " "                          | 400                      | 269                     | ..           | 1                | 10         | 13.37                      | 672.5                               | 2.50  | 25.00      | 33.42       | 12.22                              | 18.63                                      |
| D " " "                          | 767                      | 494                     | 2            | ..               | 22         | 30.19                      | 644.1                               | 2.61  | 28.68      | 39.36       | 14.37                              | 22.31                                      |
| E " " "                          | 760                      | 728                     | 4            | ..               | 4          | 38.62                      | 958.0                               | 5.26  | 15.79      | 50.82       | 18.55                              | 19.36                                      |
| E " " "                          | 230                      | 194                     | ..           | ..               | 1          | 8.23                       | 839.1                               | ..    | 4.35       | 35.79       | 13.06                              | 15.56                                      |
| Riding Establishment ..          | 884                      | 1,028                   | 5            | 2                | 7          | ..                         | 1162.9                              | 7.92  | 35.07      | ..          | ..                                 | ..                                         |
| 1st Brigade, Royal Artillery     | 104                      | 81                      | ..           | ..               | 1          | 4.73                       | 778.8                               | ..    | 9.62       | 45.48       | 16.60                              | 21.31                                      |
| 2nd " " "                        | 898                      | 539                     | 3            | 2                | 5          | 21.00                      | 600.2                               | 5.57  | 17.82      | 23.39       | 8.53                               | 14.22                                      |
| 3rd " " "                        | 919                      | 565                     | 6            | 1                | 7          | 27.23                      | 614.8                               | 7.62  | 16.32      | 29.63       | 10.81                              | 17.60                                      |
| 10th " " "                       | 1,062                    | 856                     | 5            | 1                | 6          | 44.73                      | 806.0                               | 5.65  | 21.66      | 42.12       | 15.38                              | 19.07                                      |
| 14th " " "                       | 843                      | 646                     | 9            | 4                | 13         | 25.55                      | 766.3                               | 15.42 | 9.48       | 30.31       | 10.93                              | 14.27                                      |
| 15th " " "                       | 1,083                    | 845                     | 8            | ..               | 8          | 36.60                      | 780.1                               | 7.39  | 21.24      | 33.80       | 12.34                              | 16.80                                      |
| 16th " " "                       | 969                      | 926                     | 8            | 3                | 11         | 31.42                      | 955.6                               | 11.35 | 12.38      | 32.43       | 11.86                              | 12.38                                      |
| 18th " " "                       | 47                       | 17                      | 1            | ..               | 1          | ..                         | 361.7                               | 21.28 | ..         | 6.17        | 2.25                               | 6.22                                       |
| 21st " " "                       | 810                      | 403                     | 6            | 5                | 11         | 22.60                      | 496.3                               | 13.58 | 18.52      | 27.90       | 10.18                              | 20.52                                      |
| 22nd " " "                       | 631                      | 619                     | 9            | 3                | 12         | 23.25                      | 981.0                               | 19.02 | 20.60      | 36.85       | 13.45                              | 13.71                                      |
| 23rd " " "                       | 1,057                    | 810                     | 5            | 1                | 6          | 41.98                      | 764.3                               | 5.68  | 47.30      | 39.73       | 14.50                              | 18.92                                      |
| 24th " " "                       | 978                      | 889                     | 7            | 2                | 9          | 41.13                      | 909.0                               | 9.20  | 39.88      | 42.06       | 15.35                              | 16.89                                      |
| 25th " " "                       | ..                       | ..                      | ..           | ..               | ..         | ..                         | ..                                  | ..    | ..         | ..          | ..                                 | ..                                         |
| Total Royal Artillery ..         | 1,2468                   | 9,941                   | 79           | 25               | 104        | 411.84                     | 797.3                               | 8.34  | 23.34      | 35.55       | 12.98                              | 16.86                                      |

• 1st January to 13th October.      + 18th September to 31st December.      † 1st to 20th January.      § 1st January to 12th December.  
 || Returns incomplete.

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| Regiments, &c.                                                                     | Average Annual Strength. | Admitted into Hospital. | Died.        |                  |        | Average Number daily Sick. | Annual Ratio per 1,000 of Strength. |       |            |             | Average Sick-time to each Soldier. | Average Duration of each case of Sickness. |
|------------------------------------------------------------------------------------|--------------------------|-------------------------|--------------|------------------|--------|----------------------------|-------------------------------------|-------|------------|-------------|------------------------------------|--------------------------------------------|
|                                                                                    |                          |                         | In Hospital. | Out of Hospital. | Total. |                            | Admitted.                           | Died. | Invalided. | Daily Sick. |                                    |                                            |
| Royal Engineers :—                                                                 |                          |                         |              |                  |        |                            |                                     |       |            |             | Days.                              | Days.                                      |
| Glasgow .. .. .                                                                    | 84                       | 46                      | ..           | ..               | ..     | 2 40                       |                                     |       |            |             |                                    |                                            |
| Aldershot .. .. .                                                                  | 791                      | 562                     | 2            | ..               | 2      | 31 66                      |                                     |       |            |             |                                    |                                            |
| Chatham .. .. .                                                                    | 1,332                    | 858                     | 5            | 4                | 9      | 37 69                      |                                     |       |            |             |                                    |                                            |
| Cork.. .. .                                                                        | 121                      | 51                      | 2            | ..               | 2      | 1 53                       | 641 4                               | 5 70  | 17 10      | 31 39       | 11 46                              | 17 92                                      |
| Shorncliffe .. .. .                                                                | 58                       | 24                      | ..           | 1                | 1      | 1 03                       |                                     |       |            |             |                                    |                                            |
| Curragh .. .. .                                                                    | 71                       | 35                      | ..           | ..               | ..     | 2 80                       |                                     |       |            |             |                                    |                                            |
| Devonport (not taken) .. .. .                                                      | ..                       | ..                      | ..           | ..               | ..     | ..                         |                                     |       |            |             |                                    |                                            |
| Total of Companies of Royal Engineers }<br>from which Returns have been received } | 2,457                    | 1,576                   | 9            | 5                | 14     | 77 11                      |                                     |       |            |             |                                    |                                            |

United  
Kingdom.

| Regiments,<br>&c.           | Average Annual<br>Strength. | Admitted into<br>Hospital. | Died.        |                     |        | Average number<br>daily sick. | Annual Ratio per 1,000 of<br>Strength. |       |            |             | Average sick time<br>to each soldier.<br>Days. | Average duration<br>of each case of<br>sickness.<br>Days. | Stations.                                                              |
|-----------------------------|-----------------------------|----------------------------|--------------|---------------------|--------|-------------------------------|----------------------------------------|-------|------------|-------------|------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------------|
|                             |                             |                            | In Hospital. | Out of<br>Hospital. | Total. |                               | Admitted.                              | Died. | Invalided. | Daily sick. |                                                |                                                           |                                                                        |
| Foot Guards:<br>Gren. Gds., |                             |                            |              |                     |        |                               |                                        |       |            |             |                                                |                                                           |                                                                        |
| 1st Bn. ..                  | 776                         | 658                        | 9            | 4                   | 13     | 7                             | 31·63                                  | 16·75 | 9·02       | 40·77       | 14·88                                          | 17·54                                                     | Dublin and London.                                                     |
| 2nd Bn. ..                  | 780                         | 625                        | 2            | ..                  | 2      | 8                             | 31·50                                  | 2·56  | 10·26      | 40·38       | 14·74                                          | 18·39                                                     | London, and Camp of Exercise.                                          |
| 3rd Bn. ..                  | 777                         | 770                        | 9            | 2                   | 11     | 13                            | 40·76                                  | 14·16 | 16·73      | 52·46       | 19·15                                          | 19·24                                                     | London.                                                                |
| Coldm. Gds.,                |                             |                            |              |                     |        |                               |                                        |       |            |             |                                                |                                                           |                                                                        |
| 1st Bn. ..                  | 773                         | 634                        | 4            | 1                   | 5      | 26                            | 30·25                                  | 6·47  | 33·63      | 39·13       | 14·29                                          | 17·34                                                     | London and Shorncliffe; det. at Warley.                                |
| 2nd Bn. ..                  | 781                         | 519                        | 7            | 3                   | 10     | 14                            | 38·25                                  | 12·80 | 17·92      | 48·97       | 17·88                                          | 26·90                                                     | { London, Aldershot, and Windsor; det. at Warley.                      |
| Scots F. Gds.,              |                             |                            |              |                     |        |                               |                                        |       |            |             |                                                |                                                           |                                                                        |
| 1st Bn. ..                  | 733                         | 584                        | 6            | 1                   | 7      | 21                            | 27·19                                  | 9·55  | 28·65      | 37·09       | 13·54                                          | 17·00                                                     | { Windsor, London, and Shorncliffe; dets. at Warley, and at Aldershot. |
| 2nd Bn. ..                  | 729                         | 555                        | 4            | 2                   | 6      | 17                            | 30·11                                  | 8·23  | 23·32      | 41·30       | 15·08                                          | 19·80                                                     | { London and Windsor; dets. at Warley, and at Aldershot.               |
| Total of Foot<br>Guards ... | 5,349                       | 4,345                      | 41           | 13                  | 54     | 106                           | 229·69                                 | 10·09 | 19·82      | 42·94       | 15·67                                          | 19·29                                                     |                                                                        |
| Infantry:                   |                             |                            |              |                     |        |                               |                                        |       |            |             |                                                |                                                           |                                                                        |
| 1st Foot, }                 | 502                         | 411                        | 6            | ..                  | 6      | 7                             | 15·07                                  | 11·95 | 13·94      | 30·02       | 10·96                                          | 13·38                                                     | { Fort George, and Mullingar; dets. at Bal-                            |
| 1st Bn. }                   |                             |                            |              |                     |        |                               |                                        |       |            |             |                                                |                                                           | later, Dundee, and Dublin.                                             |
| 2nd Foot, }                 | 677                         | 562                        | 2            | ..                  | 2      | 24                            | 30·62                                  | 2·95  | 35·16      | 45·23       | 16·51                                          | 19·89                                                     | Dublin and Aldershot.                                                  |
| 2nd Bn. }                   |                             |                            |              |                     |        |                               |                                        |       |            |             |                                                |                                                           |                                                                        |



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United Kingdom.

|                        |     |     |    |    |    |    |       |        |       |       |       |       |       |                                                                                |
|------------------------|-----|-----|----|----|----|----|-------|--------|-------|-------|-------|-------|-------|--------------------------------------------------------------------------------|
| 3rd Foot,<br>2nd Bn.*  | 466 | 312 | 5  | .. | 5  | 17 | 16.76 | 669.8  | 10.73 | 36.43 | 35.99 | 13.13 | 19.61 | Mullingar.                                                                     |
| 4th Foot,<br>2nd Bn.   | 529 | 381 | .. | 1  | 1  | 7  | 14.00 | 680.5  | 1.89  | 13.23 | 28.95 | 9.66  | 14.15 | { Athlone and Curragh; det. at Castlebar,<br>Ballina, Ballinrobe and Westport. |
| 5th Foot,<br>2nd Bn.   | 763 | 453 | 4  | 2  | 6  | 19 | 20.44 | 601.6  | 8.00  | 25.23 | 27.14 | 10.04 | 16.42 | Aldershot and Woolwich; det. at Purfleet.                                      |
| 6th Foot,<br>2nd Bn.   | 619 | 423 | 3  | 1  | 4  | 11 | 20.44 | 688.4  | 6.46  | 17.77 | 33.02 | 12.05 | 17.84 | Aldershot and Dover.                                                           |
| 7th Foot,<br>1st Bn.   | 579 | 676 | 2  | 1  | 3  | 19 | 23.68 | 1167.5 | 5.18  | 32.80 | 40.85 | 14.91 | 12.77 | Dover, Colchester, and Dublin.                                                 |
| 8th Foot,<br>2nd Bn.   | 775 | 675 | 4  | .. | 4  | 22 | 27.63 | 871.0  | 5.16  | 28.39 | 35.65 | 13.01 | 14.94 | Fernoy, Aldershot.                                                             |
| 9th Foot,<br>1st Bn.   | 542 | 439 | 7  | 1  | 8  | 32 | 21.28 | 810.0  | 14.76 | 59.04 | 39.26 | 14.33 | 17.69 | Aldershot and Colchester.                                                      |
| 10th Foot,<br>2nd Bn.  | 568 | 449 | 1  | 1  | 2  | 29 | 20.46 | 790.5  | 3.52  | 51.06 | 36.02 | 13.15 | 16.63 | Aldershot and Dover.                                                           |
| 11th Foot,<br>2nd Bn.  | 746 | 565 | 4  | .. | 4  | 19 | 28.25 | 757.4  | 5.36  | 25.43 | 37.87 | 13.82 | 18.25 | Aldershot.                                                                     |
| 12th Foot,<br>1st Bn.† | 505 | 474 | 1  | .. | 1  | 15 | 16.76 | 938.6  | 1.98  | 29.70 | 33.19 | 12.11 | 12.91 | Cork; det. at Youghal and at Bandon.                                           |
| 13th Foot,<br>2nd Bn.  | 677 | 587 | 1  | 1  | 2  | 21 | 29.18 | 867.1  | 2.95  | 31.02 | 43.10 | 15.73 | 18.11 | Glasgow, Aldershot; det. at Stirling.                                          |
| 14th Foot,<br>2nd Bn.  | 509 | 502 | 1  | 2  | 3  | 14 | 25.90 | 986.2  | 5.89  | 27.50 | 50.88 | 16.61 | 18.83 | { Plymouth, Belfast, Camp of Exercise; det.<br>at Carrickfergus.               |
| 15th Foot,<br>1st Bn.  | 602 | 427 | 2  | 2  | 4  | 9  | 19.16 | 709.3  | 6.63  | 14.95 | 31.83 | 11.62 | 16.38 | Aldershot and Sheffield; det. at Tynemouth.                                    |
| 16th Foot,<br>1st Bn.  | 572 | 408 | 4  | .. | 4  | 13 | 19.00 | 713.3  | 6.99  | 22.73 | 33.22 | 12.12 | 17.00 | Aldershot, Gosport.                                                            |
| 16th Foot,<br>2nd Bn.† | 76  | 39  | .. | .. | .. | .. | 2.00  | 513.1  | ..    | ..    | 26.31 | 9.60  | 18.72 | Chatham.                                                                       |
| 17th Foot,<br>2nd Bn.§ | 570 | 345 | .. | .. | .. | 15 | 17.30 | 605.3  | ..    | 26.32 | 30.35 | 11.08 | 18.30 | Curragh and Templemore.                                                        |

\* From 1st January to 1st October.  
† From 1st January to 21st September.  
‡ From 1st to 31st January.  
§ From 1st January to 4th October.

United  
Kingdom.

| Regiments,<br>&c.      | Average Annual<br>Strength. | Admitted into<br>Hospital. | Died.        |                     |        | Invalided. | Average number<br>daily sick. | Annual Ratio per 1,000 of<br>Strength. |       |            |             | Average sick time<br>to each soldier. | Average duration<br>of each case of<br>sickness. | Stations.                                                                 |                                          |
|------------------------|-----------------------------|----------------------------|--------------|---------------------|--------|------------|-------------------------------|----------------------------------------|-------|------------|-------------|---------------------------------------|--------------------------------------------------|---------------------------------------------------------------------------|------------------------------------------|
|                        |                             |                            | In Hospital. | Out of<br>Hospital. | Total. |            |                               | Admitted.                              | Died. | Invalided. | Daily sick. |                                       |                                                  |                                                                           |                                          |
|                        |                             |                            |              |                     |        |            |                               |                                        |       |            |             |                                       |                                                  |                                                                           |                                          |
| 18th Foot,<br>2nd Bn.  | 576                         | 531                        | 5            | 4                   | 9      | 22         | 20-55                         | 921-9                                  | 15-62 | 38-19      | 35-68       | Days.<br>13-02                        | 14-12                                            | { Colchester and Fernoy; det. at Tralee,<br>Queenstown, and Mitchelstown. |                                          |
| 19th Foot,<br>1st Bn.  | 625                         | 506                        | 9            | ..                  | 9      | 14         | 22-76                         | 809-6                                  | 14-40 | 22-40      | 36-42       | 13-30                                 | 16-42                                            |                                                                           | Sheffield, Aldershot; det. at Tynemouth. |
| 20th Foot,<br>2nd Bn.  | 557                         | 586                        | 7            | ..                  | 7      | 28         | 28-23                         | 1052-1                                 | 12-57 | 50-27      | 50-68       | 18-50                                 | 17-58                                            |                                                                           | Manchester, Aldershot.                   |
| 21st Foot,<br>2nd Bn.  | 537                         | 414                        | 2            | 2                   | 4      | 20         | 20-30                         | 771-0                                  | 7-45  | 37-25      | 37-80       | 13-76                                 | 17-90                                            | Portsmouth, and Forts.                                                    |                                          |
| 22nd Foot,<br>1st Bn.  | 537                         | 289                        | 5            | ..                  | 5      | 12         | 12-23                         | 538-2                                  | 9-29  | 22-35      | 22-77       | 8-31                                  | 15-45                                            | { Fleetwood; det. at Isle of Man, and Liver-<br>pool.                     |                                          |
| 23rd Foot,<br>1st Bn.  | 573                         | 362                        | 5            | 3                   | 8      | 8          | 18-05                         | 631-8                                  | 13-96 | 13-96      | 31-50       | 11-50                                 | 18-20                                            | { Cork and Dublin; det. at Fort Camden,<br>Youghal, and Bantry.           |                                          |
| 24th Foot,<br>2nd Bn.  | 590                         | 433                        | 2            | 1                   | 3      | 9          | 16-33                         | 733-9                                  | 5-08  | 15-25      | 27-68       | 10-10                                 | 13-77                                            | Dover.                                                                    |                                          |
| 25th Foot,<br>2nd Bn.* | 400                         | 196                        | 1            | ..                  | 1      | 5          | 9-64                          | 490-0                                  | 2-50  | 12-50      | 24-10       | 8-79                                  | 17-95                                            | Shorncliffe.                                                              |                                          |
| 26th Foot ..           | 577                         | 398                        | 5            | 1                   | 6      | 2          | 23-28                         | 689-8                                  | 10-40 | 3-47       | 40-70       | 14-73                                 | 21-43                                            | { Portsmouth, Glasgow; det. at Mary-<br>hill.                             |                                          |
| 27th " t..             | 710                         | 466                        | 4            | ..                  | 4      | 12         | 22-04                         | 656-3                                  | 5-63  | 16-90      | 31-04       | 11-33                                 | 17-26                                            | Enniskillen, Belfast, &c.                                                 |                                          |
| 29th " ..              | 618                         | 382                        | 2            | 1                   | 3      | 7          | 15-02                         | 618-1                                  | 48-38 | 11-33      | 24-30       | 8-87                                  | 14-35                                            | Jersey, Chatham, and Camp of Exercise.                                    |                                          |
| 30th " ..              | 632                         | 514                        | 4            | ..                  | 4      | 7          | 23-26                         | 813-3                                  | 6-33  | 11-08      | 36-80       | 13-43                                 | 16-52                                            | Chester, and Chatham.                                                     |                                          |
| 31st " t..             | 321                         | 223                        | 1            | 2                   | 3      | 5          | 10-13                         | 693-1                                  | 9-35  | 15-58      | 31-56       | 11-52                                 | 16-58                                            | Portland, and Camp of Exercise.                                           |                                          |
| 36th " ..              | 665                         | 463                        | 5            | 1                   | 6      | 22         | 24-73                         | 696-2                                  | 9-02  | 33-08      | 37-19       | 13-57                                 | 19-49                                            | Devonport, and Camp of Exercise.                                          |                                          |
| 37th " ..              | 572                         | 481                        | 4            | 1                   | 5      | 11         | 22-90                         | 840-9                                  | 8-74  | 19-23      | 40-03       | 14-61                                 | 17-38                                            | Gosport; det. at Portland.                                                |                                          |
| 38th " ..              | 593                         | 579                        | 3            | ..                  | 3      | 13         | 26-75                         | 976-4                                  | 5-06  | 21-92      | 45-11       | 16-69                                 | 16-86                                            | { Fort Rowner, Manchester, Camp of Exer-<br>cise; det. at Gosport Forts.  |                                          |

|           |   |         |     |     |    |    |    |    |       |        |       |       |       |       |       |                                                 |
|-----------|---|---------|-----|-----|----|----|----|----|-------|--------|-------|-------|-------|-------|-------|-------------------------------------------------|
| 41st      | " | ..      | 575 | 408 | 3  | .. | 3  | 19 | 14-71 | 709-6  | 5-23  | 33-04 | 25-58 | 9-34  | 13-16 | { Shorncliffe and Pembroke; detts. at Port-     |
| 46th      | " | \$..    | 478 | 274 | 4  | .. | 4  | 8  | 14-81 | 578-2  | 8-37  | 16-74 | 30-98 | 11-31 | 19-78 | { land, Brecon, &c.                             |
| 47th      | " | ..      | 533 | 491 | 3  | 1  | 4  | 28 | 22-38 | 842-2  | 6-86  | 48-03 | 38-39 | 14-01 | 16-64 | { Limerick; detts. at Clare Castle and Camden   |
| 49th      | " | ..      | 530 | 357 | 4  | 1  | 5  | 19 | 14-67 | 673-6  | 9-43  | 35-85 | 27-68 | 10-10 | 15-00 | { Fort.                                         |
| 50th      | " | ..      | 554 | 235 | 3  | 1  | 4  | 2  | 9-23  | 424-2  | 7-32  | 3-61  | 16-66 | 5-92  | 14-84 | { Aldershot, Jersey.                            |
| 52nd      | " | ..      | 574 | 449 | 4  | 1  | 5  | 9  | 26-76 | 782-2  | 8-71  | 15-63 | 46-62 | 17-02 | 21-75 | { Isle of Wight, Portsmouth, Camp of Exer-      |
| 53rd      | " | ..      | 570 | 415 | 8  | .. | 8  | 3  | 10-00 | 728-1  | 14-04 | 5-26  | 17-54 | 6-40  | 8-80  | { cise.                                         |
| 58th      | " | ..      | 584 | 446 | .. | 1  | 1  | 12 | 25-82 | 763-7  | 1-71  | 20-55 | 44-21 | 16-13 | 21-18 | { Birr, Curragh, and Kinsale; detts. at Nenagh, |
| 60th      | " | 3rd Bn. | 631 | 374 | 5  | .. | 5  | 19 | 16-11 | 592-7  | 7-92  | 30-11 | 25-53 | 9-32  | 15-72 | { Camden Fort, and Bantry.                      |
| 60th      | " | "       | 609 | 631 | 3  | 1  | 4  | 12 | 17-00 | 1061-7 | 6-67  | 20-00 | 28-33 | 10-32 | 9-88  | { Portsmouth, Plymouth, and Camp of Exer-       |
| 61st Foot | " | "       | 636 | 586 | 3  | 1  | 4  | 8  | 27-00 | 921-4  | 6-29  | 12-58 | 42-46 | 15-50 | 16-83 | { cise.                                         |
| 64th      | " | "       | 578 | 549 | 6  | 1  | 7  | 14 | 24-07 | 949-8  | 12-11 | 24-22 | 41-64 | 15-20 | 16-00 | { Templemore, Curragh, Birr; detts. at Carlisle |
| 75th      | " | "       | 523 | 284 | 1  | .. | 1  | 12 | 13-19 | 543-0  | 1-91  | 22-94 | 25-20 | 9-20  | 16-95 | { Fort, Tralee, Roscrea, &c.                    |
| 76th      | " | "       | 425 | 250 | 2  | 1  | 3  | 17 | 13-41 | 588-2  | 7-06  | 40-00 | 31-55 | 11-52 | 19-58 | { Gosport, Aldershot Camp of Exercise.          |
| 77th      | " | "       | 558 | 432 | 2  | .. | 2  | 10 | 12-26 | 774-2  | 3-58  | 17-92 | 21-97 | 8-02  | 10-36 | { Chatham, Winchester; detts. at Sheer-         |
| 78th      | " | "       | 581 | 228 | 3  | .. | 3  | 4  | 8-96  | 392-4  | 5-16  | 6-88  | 15-42 | 5-63  | 14-38 | { ness, Woolwich, and Marchwood.                |
| 79th      | " | "       | 564 | 436 | 5  | 3  | 8  | 14 | 22-76 | 773-0  | 14-18 | 24-82 | 40-19 | 14-73 | 19-06 | { Dublin and Fernoy; detts. at Haulbowline,     |
| 82nd      | " | "       | 563 | 287 | .. | 1  | 1  | 3  | 11-57 | 509-8  | 1-78  | 5-33  | 20-55 | 7-50  | 14-71 | { &c.                                           |
| 84th      | " | "       | 584 | 471 | 8  | 2  | 10 | 12 | 23-19 | 896-5  | 17-12 | 20-55 | 39-71 | 14-50 | 17-98 | { Guernsey, Aldershot; det. at Alderney.        |
| 86th      | " | "       | 539 | 343 | 4  | 1  | 5  | 12 | 15-63 | 643-5  | 9-37  | 22-51 | 29-32 | 10-70 | 16-63 | { Portsmouth, Aldershot.                        |

|| From 1st January to 1st November.

¶ From 11th April to 31st December.

† From 3rd May to 31st December.

§ From 1st January to 20th October.

• From 28th March to 31st December.

† From 1st January to 17th November.

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| Regiments,<br>&c. | Average Annual<br>Strength. | Admitted into<br>Hospital. |                     |    | Died.  |            |           | Average number<br>daily sick. | Annual Rate per 1,000 of<br>Strength. |            |             |                | Average sick time<br>to each soldier. | Average duration<br>of each case of<br>sickness.                                                                                                                                                                                                                                                                                                                          | Stations. |
|-------------------|-----------------------------|----------------------------|---------------------|----|--------|------------|-----------|-------------------------------|---------------------------------------|------------|-------------|----------------|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
|                   |                             | In Hospital.               | Out of<br>Hospital. |    | Total. | Invalided. | Admitted. |                               | Died.                                 | Invalided. | Daily sick. |                |                                       |                                                                                                                                                                                                                                                                                                                                                                           |           |
|                   |                             |                            |                     |    |        |            |           |                               |                                       |            |             |                |                                       |                                                                                                                                                                                                                                                                                                                                                                           |           |
| 88th Foot ..      | 677                         | 618                        | 16                  | 3  | 19     | 23         | 24·07     | 912·9                         | 28·06                                 | 33·97      | 35·55       | Days.<br>12·98 | Days.<br>14·22                        | { Preston and Curragh; dets. at Athlone,<br>Castlebar, Boyle, &c.<br>{ Dublin and Limerick; dets. at Clare Castle,<br>&c.<br>Curragh, Enniskillin.<br>Shorncliffe and Dublin.<br>12·71                                                                                                                                                                                    |           |
| 90th „ ..         | 539                         | 450                        | 3                   | .. | 3      | 5          | 20·00     | 834·9                         | 5·56                                  | 9·28       | 37·10       | 13·54          | 16·22                                 | { Belfast, Newry; dets. at Drogheda, Mon-<br>aghan, Trim, Navan, and Newtownards.<br>{ Penbrooke and Cork; dets. at Newport, and<br>Carlisle Fort.<br>Colchester, Aldershot.<br>Curragh and Kilkenny; dets. at Clonmel,<br>Waterford, &c.<br>{ Kilkenny; dets. at Waterford, Clonmel,<br>Carrick-on-Suir, Dungarvon, and Dublin;<br>Aldershot, Camp of Exercise.<br>14·33 |           |
| 91st „ ..         | 510                         | 402                        | 7                   | 1  | 8      | 7          | 17·78     | 788·2                         | 15·69                                 | 13·72      | 34·86       | 12·72          | 16·14                                 | { Portland; dets. at Marchwood and Wey-<br>mouth.<br>Devonport and Templemore; det. at Spike<br>Island.<br>15·56                                                                                                                                                                                                                                                          |           |
| 93rd „ ..         | 510                         | 413                        | 1                   | .. | 1      | 10         | 14·38     | 809·8                         | 1·98                                  | 19·80      | 28·20       | 10·29          | 12·71                                 | { Aldershot and Colchester.<br>Aldershot and Colchester.<br>Liverpool, and Isle of Man.<br>14·60                                                                                                                                                                                                                                                                          |           |
| 94th „ ..         | 591                         | 365                        | 3                   | 2  | 5      | 10         | 14·33     | 617·6                         | 8·46                                  | 16·92      | 24·25       | 8·85           | 14·33                                 | { Parkhurst; dets. at Cowes, and at Sandown.<br>17·42                                                                                                                                                                                                                                                                                                                     |           |
| 95th „ ..         | 573                         | 425                        | ..                  | 1  | 1      | 9          | 16·90     | 741·7                         | 1·75                                  | 15·71      | 29·49       | 10·77          | 14·51                                 |                                                                                                                                                                                                                                                                                                                                                                           |           |
| 96th „ ..         | 580                         | 607                        | 1                   | .. | 1      | 22         | 25·87     | 1046·5                        | 1·72                                  | 37·93      | 44·60       | 16·28          | 15·56                                 |                                                                                                                                                                                                                                                                                                                                                                           |           |
| 99th „ ..         | 588                         | 335                        | 6                   | 1  | 7      | 7          | 13·40     | 569·7                         | 11·90                                 | 11·90      | 22·79       | 8·33           | 14·60                                 |                                                                                                                                                                                                                                                                                                                                                                           |           |
| 100th „ ..        | 776                         | 753                        | 1                   | .. | 1      | 14         | 30·14     | 970·4                         | 1·29                                  | 18·04      | 38·84       | 14·18          | 14·61                                 |                                                                                                                                                                                                                                                                                                                                                                           |           |
| 102nd „ *         | 191                         | 99                         | 1                   | 1  | 2      | 5          | 6·54      | 518·3                         | 10·47                                 | 26·18      | 34·24       | 12·50          | 24·11                                 |                                                                                                                                                                                                                                                                                                                                                                           |           |
| 103rd „ ..        | 567                         | 366                        | 5                   | .. | 5      | 15         | 24·50     | 645·5                         | 8·82                                  | 26·45      | 43·21       | 15·77          | 24·43                                 |                                                                                                                                                                                                                                                                                                                                                                           |           |
| 104th „ ..        | 562                         | 464                        | 2                   | 1  | 3      | 9          | 23·15     | 825·6                         | 5·34                                  | 16·01      | 41·19       | 15·03          | 18·21                                 |                                                                                                                                                                                                                                                                                                                                                                           |           |
| 105th „ ..        | 544                         | 501                        | 4                   | 2  | 6      | 21         | 25·11     | 920·9                         | 11·03                                 | 38·60      | 46·16       | 16·85          | 18·29                                 |                                                                                                                                                                                                                                                                                                                                                                           |           |
| 106th „ ..        | 545                         | 521                        | 8                   | .. | 8      | 12         | 26·32     | 956·0                         | 14·68                                 | 22·02      | 48·29       | 17·63          | 18·44                                 |                                                                                                                                                                                                                                                                                                                                                                           |           |
| 107th „ ..        | 575                         | 472                        | 6                   | .. | 6      | 33         | 22·53     | 820·9                         | 10·43                                 | 57·39      | 39·18       | 14·30          | 17·42                                 |                                                                                                                                                                                                                                                                                                                                                                           |           |

# REPORT FOR 1876.

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Kingdom.

|                                               |        |        |     |     |     |     |          |        |       |       |       |       |       |                                                                     |
|-----------------------------------------------|--------|--------|-----|-----|-----|-----|----------|--------|-------|-------|-------|-------|-------|---------------------------------------------------------------------|
| Rifle Brig. }<br>1st Bn. }                    | 684    | 489    | 3   | 1   | 4   | 9   | 23.42    | 715.0  | 5.85  | 13.16 | 34.24 | 12.35 | 17.28 | Manchester and Dublin; det. at Curragh.<br>Chatham and Shorncliffe. |
| Rifle Brig. }<br>3rd Bn. }                    | 527    | 346    | 5   | ..  | 5   | 34  | 15.86    | 656.5  | 9.49  | 64.52 | 30.09 | 10.99 | 16.73 |                                                                     |
| Total of<br>Infantry<br>Regiments }           | 40,113 | 30,503 | 254 | 57  | 311 | 972 | 1371.94  | 760.4  | 7.75  | 24.23 | 34.20 | 12.48 | 16.42 |                                                                     |
| Depôts and<br>Brigade<br>Depôts }             | 9,358  | 7,780  |     | 122 |     | 418 | 361.30   | 842.1  | 13.04 | 43.51 | 38.61 | 14.09 | 16.95 |                                                                     |
| Depot Brig.<br>R. Artillery:<br>1st Division. | 728    | 694    | 2   | ..  | 2   |     | 27.21    |        |       |       |       |       |       |                                                                     |
| 2nd "                                         | 1,722  | 2,081  | 15  | 2   | 17  |     | 86.08    | 1132.7 | 7.76  | 32.25 | 46.24 | 16.88 | 14.90 |                                                                     |
| Total..                                       | 2,450  | 2,775  | 17  | 2   | 19  |     | 79113.29 |        |       |       |       |       |       |                                                                     |

\* From 1st January to 15th April.

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The health results in troops which returned from India during the year, are grouped separately in the following Table (all arms being combined) :—

| Strength. | Admitted. | Died. | Invalided. | Average number constantly Sick. | Ratio per 1,000 of Strength. |       |            |             | Average Sick Time to each Soldier. | Average duration of each Case of Sickness. |
|-----------|-----------|-------|------------|---------------------------------|------------------------------|-------|------------|-------------|------------------------------------|--------------------------------------------|
|           |           |       |            |                                 | Admitted.                    | Died. | Invalided. | Daily Sick. |                                    |                                            |
| 1,928     | 1,688     | 14    | 122        | 80·99                           | 875·5                        | 7·26  | 63·28      | 42·01       | Days.<br>15·33                     | Days.<br>17·51                             |

*Relation of the Prevalence of Sickness to Age.*

The admissions into hospital at different ages, and the rates per 1,000 of the strength, are shown in the following Table :—

|                            | Under 20. |                         | 20 and under 25. |                         | 25 and under 30. |                         | 30 and under 35. |                         | 35 and under 40. |                         | 40 and upwards. |                         |
|----------------------------|-----------|-------------------------|------------------|-------------------------|------------------|-------------------------|------------------|-------------------------|------------------|-------------------------|-----------------|-------------------------|
|                            | Strength. | Admitted into Hospital. | Strength.        | Admitted into Hospital. | Strength.        | Admitted into Hospital. | Strength.        | Admitted into Hospital. | Strength.        | Admitted into Hospital. | Strength.       | Admitted into Hospital. |
|                            |           |                         |                  |                         |                  |                         |                  |                         |                  |                         |                 |                         |
|                            | 15,031    | 13,221                  | 29,525           | 27,630                  | 15,717           | 10,622                  | 9,598            | 4,849                   | 12,458           | 6,061                   | 3,961           | 2,814                   |
| Rate per 1,000 of Strength | 879·6     |                         | 954·1            |                         | 676·5            |                         | 506·1            |                         | 486·5            |                         | 728·6           |                         |

Except in one important particular, the rates in the present year are in very close accordance with the corresponding ones for 1875 ; the nonconformity is in the group of ages under 20, which gave the highest rate of admissions in the preceding year, but in the present year gives only the second highest.

VACCINATION.

The following Table shows the condition as to vaccination of recruits found fit for the service on primary inspection by Army Medical Officers. No information is available respecting those primarily inspected by Civil Medical Practitioners :—

|                                                     | Number of Recruits found fit for the Service. | Ratio per 1,000. |
|-----------------------------------------------------|-----------------------------------------------|------------------|
| Had marks of vaccination .. ..                      | 20,437                                        | 916·4            |
| Had marks of smallpox .. ..                         | 1,138                                         | 51·0             |
| Had neither marks of vaccination nor smallpox .. .. | 727                                           | 32·6             |
| Total .. ..                                         | 22,302                                        | 1,000·0          |

The proportions under the different heads correspond very closely with those of last year. There is a slight increase in the ratio of recruits with marks of vaccination, and a decrease in those with neither marks of vaccination nor smallpox. *United Kingdom.*

The following Table, compiled from the monthly vaccination returns, shows the number of soldiers vaccinated during the year, with the proportions per 1,000 of successful vaccinations and failures, when vaccinated with fresh or preserved lymph:—

|                                 | Fresh Lymph.  |                  | Preserved Lymph. |                  |
|---------------------------------|---------------|------------------|------------------|------------------|
|                                 | No. of Cases. | Ratio per 1,000. | No. of Cases.    | Ratio per 1,000. |
| A perfect vaccine vesicle .. .. | 4,717         | 455·4            | 5,346            | 309·6            |
| A modified ditto .. ..          | 4,400         | 424·8            | 6,432            | 372·4            |
| A failure .. ..                 | 1,241         | 119·8            | 5,491            | 318·0            |
|                                 | 10,353        | 1000·0           | 17,269           | 1000·0           |

The large increase in the number of vaccinations is due to the enlistment of a greater number of recruits. There is an increase in the proportion of perfect vesicles among those vaccinated with fresh lymph, and an increase in the proportion of perfect vesicles and failures among those vaccinated with preserved lymph.

## HOME STATIONS.

### SANITARY REPORT.

#### *Aldershot.*

Surgeon-General Grant reports, that “in a sanitary point of view, there have been no defects to call for any particular notice; suggestions were, however, made in the estimates for some additions and improvements. The conservancy of the camp and barracks is well attended to.

“The following sanitary improvements are in course of execution, and will be completed early in the current year:—The reconstruction of waste water pipes from sinks to sewer; addition of six water-closets to hospital huts, North Camp; and the ventilation of soil pipes.

“If the admissions which took place in the month of July, during the mobilization of the 2nd Army Corps, be included, the total admissions will be 11,130, which are then less than in 1875, and calculated from this mean strength, the millesimal ratio is as follows:—

|                                 | 1875. | 1876. |
|---------------------------------|-------|-------|
| Admissions .....                | 902·1 | 844·7 |
| Death from all causes .....     | 6·7   | 6·0   |
| Constantly sick .....           | 52·5  | 43·0  |
| Mean duration to each man ..... | 13·0  | 14·2  |
| Invalids .....                  | 39·4  | 35·3  |

“This epitome represents almost all that may be said regarding the health of the troops; the past year contrasts favourably with 1875 in the three first and last headings.

“One admission for smallpox occurred in a man of the Royal Engineers; the patient bore distinct marks of vaccination and re-vaccination; the disease was so mild in form that comment is unnecessary.

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*"Accommodation.*—The Permanent Barracks are occupied by the Royal Horse Artillery, Field Batteries, and three Cavalry and three Infantry Regiments.

The Huts, South Camp, are occupied by the Royal Engineers, Army Service Corps, Army Hospital Corps, and four Regiments of Infantry.

The Huts, North Camp, are occupied by four Regiments of Infantry.

There has been no overcrowding; the average number occupying each hut has been 15. The situation of the huts, their structure, mode of ventilation, condition and general surroundings render them ill adapted for permanent quarters for troops.

The Hospital accommodation is sufficient; for a short time in the summer, a few marquees have to be brought into use for trivial cases.

The water supply has been good and abundant in the Permanent Barracks, in the Huts, South Camp, from reservoirs and wells, and in the North Camp from wells only.

*"Ablutions.*—Water is laid on by pipes in the South Camp and Permanent Barracks; in the North Camp from wells. It has been recommended that hot water be laid on, and also an additional bath to each ablution room provided; this has been under consideration for some time.

The Rations are good; bread and meat only are now supplied from the Commissariat; since the 1st April the other things necessary for messing have been obtained by contract regimentally.

*"Cooking.*—Dean's patent is in use; the dinners are varied,—baked, stewed and soups.

*"Clothing.*—Good and suitable; no change during the year.

The Gymnasium is attended compulsorily by young officers and soldiers; also well attended voluntarily.

Medical Officers speak of it favourably, and of the beneficial results to recruits.

The Latrines are on Jennings' principle in the Permanent Barracks and South Camp, on the dry-earth system in the North Camp.

The station sustains its character for health and salubrity, more so than most parts of England."

*Eastern District.*

Deputy Surgeon-General Best reports, "that in the early months, when, as usually observed, cold easterly winds, not unfrequently accompanied by snow, sleet or rain, prevailed, there was a good deal of sickness, though not of a very serious nature, chiefly from sore throats, bronchial affections, and rheumatism; otherwise the general health of the troops was very satisfactory, and the same remark applies to the married families, with the exception of a rather severe outbreak of measles among children, at Warley, in the month of June. In last year's report allusion was made to troops, arriving at home from India in the depth of winter, being sent to such exposed stations as Colchester and Warley, and further experience only tends to confirm the opinion then given, viz., the desirability, if practicable, of quartering them in mores sheltered localities, until the summer season has fairly set in. With regard to barracks, hospitals, and subsidiary buildings, the accommodation has been all that could be desired, and their sanitary condition has been carefully attended to. There is still, however, much need of better accommodation at Norwich and Great Yarmouth for the families of married soldiers. At the latter station, also, the drainage is defective, and must continue to be so as the barracks are now situated. I would again advocate the introduction of the dry-earth system into the Camp at Colchester, the present method being objectionable and more or less insanitary. The results of an analysis of the well water in the Camp, in the early part of the year, were not so satisfactory as could be desired. Sanitary precautions were therefore at once carried out; it may, however, be mentioned that no sickness traceable to the use of this water had been previously observed, nor has any been noted since.

The following are among the most noteworthy sanitary works and improvements that have been carried out during the past year:—



*"Colchester, Cavalry Barracks.*—Large sized ventilating grates have been substituted throughout the right wing for the old pattern stove, and have given *United Kingdom.* satisfaction.

*"Sundry additions and alterations* have been made to the drainage, &c., by ventilation under various points noted in W. O. Memo. on subject of prevention of escape of sewerage gas into buildings; improved water supply for officers' quarters, staff sergeants' quarters and canteen; the wastes from all sinks in the barracks now discharge into the open air, and ventilation has been provided for soil pipes throughout the men's barracks and officers' quarters.

*"Artillery Barracks.*—Paved beats have been provided for sentries. Properly trapped sinks have replaced the basins in the passages of officers' quarters.

*"Camp Huts.*—In D Lines a covered space has been provided for parading under in wet weather; ventilation has been provided to the drains at the infants' school and hospital.

*"Warley.*—In all the barrack-rooms additional windows—a great improvement as regards both light and ventilation—have been provided.

*"More accommodation* has been provided for troops in the barracks by converting the old canteen into four and the old gymnasium into three rooms.

*"A commodious canteen* has been provided by utilizing a detached house, formerly officers' mess.

*"Additional baths, ablution rooms, cells, latrines and urinals* have been provided.

*"Ipswich.*—Ventilating shafts have been attached to the stables and a wash-stand for private ablution has been provided for the use of the men of the Royal Artillery.

*"As usual, venereal disease* has contributed largely to the general amount of sickness. I am not, however, aware that it is on the increase; and it is satisfactory to be again able to report most favourably upon the salutary effect of the Contagious Diseases Act at Colchester, the only station in the District where it is in operation. A very good account can be given of the advantages derived from the well-conducted course of gymnastic training at Colchester and Warley, more especially observable among young soldiers and recruits."

#### *South-Eastern District.*

**Deputy Surgeon-General Watt reports :—**

*"The health of the troops in the South-Eastern District during the year 1876* has been very satisfactory. They have enjoyed a remarkable immunity from diseases of an infectious nature; only three cases have occurred, viz., one of scarlet fever, and two of measles.

*"Several cases of smallpox* have been reported among the civil population at various places in the district, but none have occurred among the military.

*"A few cases of scarlet fever* appeared among the children of soldiers at Newhaven in the early part of the year; measles also prevailed among the children at Chichester, and to a considerable extent among those at Dover. Nearly all the patients, however, made a good recovery.

*"Medical officers continue to report the beneficial influence of gymnastic training* on those who have passed through a course. They unanimously record their opinion that the physique and muscular development of the men are much improved thereby.

*"The Contagious Diseases Acts are in operation at four stations.* There has been a decrease of primary syphilis at Dover; also of gonorrhœa at Dover, Canterbury, and Maidstone; an increase of primary syphilis at Canterbury and Maidstone, and of both affections at Shorncliffe. The increase at the latter place can probably be accounted for by the fact that many of the cases were from regiments (such as the Foot Guards) which came from unprotected stations. I must reiterate my opinion that these enactments exercise a salutary influence on the health of the soldier, a view in which I am supported by nearly all the medical officers in the Command.

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Kingdom.*

"The following remarks are applicable to individual stations in the South-Eastern District :—

"*Dover*.—With regard to the recommendations alluded to in previous Reports as to the necessity for providing accommodation for infectious diseases among soldiers, a women's hospital, and quarters for the Army Hospital Corps, I would again strongly urge their provision.

"I have recommended that porches should be provided for the doors of the hospital huts, Western Heights, to prevent the rain beating into the passages ; it is also desirable that these huts should be fitted with shelves for the patients' clothing.

"*Shorncliffe*.—The same remarks apply to this station as to Dover, relative to the provision of an infectious hospital for women and children. No steps have yet been taken for the erection of a suitable building for this purpose.

"During the year improvements have been effected in the main drainage of the Camp ; new barracks have been erected, and a new latrine has been added to the Artillery quarters. The other latrines are in the same condition as noted in last year's report, and the remarks therein concerning them are applicable at present.

"*Canterbury*.—New barracks have been erected in the Cavalry Square, and taken into occupation.

"The whole of the drainage, which was defective, has undergone repair and alteration, and I expect that much improvement will be effected thereby.

"*Brighton*.—A nuisance was caused by the establishment of a dépôt for the storage of manure opposite the barracks. A representation was made to the local sanitary authorities, and in consequence of their action the nuisance was removed.

"*Chichester*.—Water has been laid on from the town waterworks, and gas has been recently introduced into the barracks with great advantage. The Artillery stables at this station are being converted into barrack rooms for the use of the Militia.

"At other stations the sanitary conditions do not call for any special remark."

#### *Chatham.*

Deputy Surgeon-General Auchinleck reports that "the health of the troops in the Chatham District has been fairly good during the past year. There have been no epidemics, nor has there been much serious disease. Smallpox has shown itself twice during the year, but did not spread ; it is still prevalent in the towns of Chatham and Rochester, but the troops continue to enjoy exemption, a proof, if any were needed, of the protection afforded by re-vaccination.

"Venereal diseases have largely prevailed, and the latter half of the year shows a considerable increase in the numbers affected with this disorder. Two of the regiments in the garrison have come from unprotected stations, and the number of recruits constantly joining is considerable, in many of whom the disease manifests itself soon after their arrival, showing that they have probably contracted it elsewhere. The stations in the district are under "the Act." Soldiers are however constantly going away for short leave to London and other places.

"The rations have been invariably reported by the medical officers as good ; the meat is, as has been often said before, too small in quantity for young men actively employed ; when the bone is removed, and the meat has been cooked, from the  $\frac{3}{4}$  lb. allowed per man scarcely six ounces remain.

"The cooking arrangements are generally good, and have undergone no change.

"Water supply is also favourably reported on.

"At my half-yearly inspection I noted several matters which seemed to require special attention, and brought them at an early date to the notice of the military authorities.

"To these representations replies of a generally satisfactory nature were given, and the defects will be remedied in the course of time.

"I also drew attention to the want of a drill shed for the men at St. Mary's Barracks; this however is a work requiring a special grant of funds. *United Kingdom.*

"In the Brompton Barracks there is a gymnasium in which the troops undergo a regular course of training; the medical officers speak favourably of the effects of this course on the men's health and physique generally. There is no gymnasium at Gravesend or Sheerness.

"The following is a list of sanitary services executed by the Royal Engineers during the year that is past:—

"*Chatham, Brompton Barracks.*—Drainage improved; kitchens in servants' rooms ventilated; latrines provided at Royal Engineers' Institute; and drying room constructed in each of the four ablution rooms, with other minor services.

"*Chatham Barracks.*—Sinks and water supply to kitchens in officers' quarters provided; also four iron ash bins.

"*Gravesend, Tilbury Fort.*—Drainage and water supply improved; the system of sewerage changed to glazed earthenware pipe drains.

"*Milton Barracks.*—Separate cisterns to all waterclosets and latrines fixed; traps and drains ventilated, and wastes from sinks and cisterns altered.

"*Sheerness Garrison.*—Wastes of sinks disconnected; main sewers, guard-rooms, and quarters ventilated; latrines to quarters, guard-rooms, cells, &c., converted into Goux's latrines: water laid on to urinals at the main guard; iron ash bins provided at Station Hospital; and a new well shaft bored to obtain a new supply of water.

"A number of works have been proposed for execution in 1877."

#### *Woolwich.*

Deputy Surgeon-General Small reports:—

"The general health of the troops has been on the whole satisfactory. There has been a slight increase in the actual number of "sick and inefficient" as against the previous year.

"Regarding the number of admissions for minor wounds and accidents, it may be remarked that these are inseparable from the nature of the duties of the Artillery arm of the service; and the large number of admissions from skin diseases is explained apparently by the great number of recruits which have been added to the strength during the year, as certain forms of skin disease are common amongst them. The admissions for venereal disease continue to cause a great deal of inefficiency, being equal to about one-sixth of the entire admissions. I regret I have nothing new to add to the remarks which were furnished last year by my predecessor upon this subject, as I fully accept his views in regard to the great difficulties which exist in Woolwich against the better prevention of this evil.

"The largest mortality has occurred among the troops from diseases of the respiratory system; and there is a circumstance, in connection with diseases of the chest generally, which I am desirous of bringing prominently to notice, namely, the predisposition to contract these affections amongst those soldiers who return here after long service in India, and whose constitutions are more or less impaired by the climatic diseases of that country.

"This was remarkable in the men of the 23rd Brigade, Royal Artillery, during the year, and, according to the reports of my predecessors, a similar experience was gained from observation of the men of the 18th Brigade, Royal Artillery, who occupied the garrison under the same condition in the previous year, viz., after a previous prolonged tour of Indian service. My limited experience has impressed me with the belief that, military reasons permitting, it would be more beneficial to the State and soldier were such men on first arrival in England quartered elsewhere, at Aldershot, for instance.

"Referring to the different forms of fever by which the admissions into hospital have been occasioned, it will be observed that typhus and typhoid fevers have occurred but very infrequently, while, on the other hand, intermittent fever accounts for more than a third of the entire number, and the attacks are

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reported to have taken place for the most part in men either recently home from India, or with considerable previous Indian service.

"I should not have alluded to this except in connection with the previous question, namely, the propriety of quartering soldiers at Woolwich during their first year's service at home.

"I am unable to add anything to the remarks of my predecessors upon the subject of ventilation, cooking, drainage, accommodation and sanitary condition of barracks, camps and quarters, except that everything appears to receive proper attention. I am anxious, however, to see some improvements carried out in the Herbert Hospital, for the better treatment of disease, and which might be effected without much difficulty or expense. From the size of the wards, their mode of ventilation, and extent of window surface, it has been found that the heat falls very quickly, and although there are two stoves they appear inadequate to maintain the ward temperature at the uniform standard so desirable in the treatment of pulmonary affections. Almost every other class of disease seems to do well in the wards. I have forwarded and recommended an application from the medical officer in charge to have one of the present wards heated with hot water coils, and this recommendation is now under the consideration of the authorities. Again, the wards themselves are very noisy; the present polished oak floors resound to a painful degree when walked upon. A strip of matting, extending along the foot of the beds from one end of the ward to the other, would effect a great improvement in this respect.

"The following are the principal sanitary services in course of progress or carried into effect during the year :—

"1st. The *old latrines* at the camp on the common have been pulled down, and *new latrines* have been put up on M'Farlane's principle, to be flushed with water.

"2nd. *Barracks and Officers' quarters generally.*—Separate cisterns are being gradually provided, so as to separate the supply of water for drinking and cooking from that for flushing waterclosets. Wastes from cisterns are being made to flow into the open, and soil-pipes are being ventilated. About one-fifth of the work was completed during the past year.

"A number of sanitary recommendations have been made during the period embraced in this report."

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#### *Southern District.*

Surgeon-General Bowen reports :—

"The general health of the troops in the Southern District has been extremely good, and no particular causes can be pointed out as having affected the health of the men in any way. There is a marked difference in the number of cases of venereal disease admitted in those places where the Contagious Diseases Act is in force, and those where it is not. I would instance especially Parkhurst and Portland.

"I have not noticed any sanitary defects that have not already been reported, and which are now either in progress of improvement or under consideration. The great difficulty in many places in this district arises from the low and level nature of the ground, which offers great difficulty to proper drainage in the vicinity of many of the barracks and forts; nevertheless during the past year there has been but very little disease that could be attributed to malaria.

"There is a general opinion amongst medical officers of experience, in which I concur, that the meat ration of the soldier is not sufficient, especially when he is employed on public works, as is very much the case here. I think that at least a quarter of a pound of meat more, or something equivalent, should be given, at any rate when the men are employed at hard work.

"The leading sanitary improvements have been as follows, and the general state of the different barracks and their vicinity is fairly good in a sanitary point of view :—

"*Cambridge Barracks.*—Sinks for carrying away slops have been provided for the married soldiers' quarters.

"*Gun Wharf Barracks*.—Foot-baths, with hot water supply provided.

"*Female Hospital*.—A new washhouse has been erected.

"*Gymnasium, Portsmouth*.—New latrine and urinal erected.

"*Gosport Station Hospital*.—The drainage of the officers' quarters improved.

"*Gosport New Barracks*.—Guard-room enlarged.

"*Winchester Barracks*.—Stone instead of wooden floors have been provided for the men's latrines, and the ventilation improved.

"*Christchurch Barracks*.—Urinal for the men has been erected at the back of the store.

"*Hilsea Barracks*.—Improved trapping to the drains, and connection of some of the Government buildings with the general drainage system.

"The training of men at the gymnasium has been undoubtedly of great advantage to them, and the number of accidents has been by no means large, as there is great care exercised by the instructors in the training of the men.

"I consider that it would be a great advantage if the Contagious Diseases Act were brought into operation at Portland and Weymouth, and at Cowes and Newport.

"Scarlet fever was prevalent amongst the civil population at Southsea and Portsmouth, and there were a few cases amongst the soldiers' children, and six cases amongst the troops.

"Four cases of enteric fever are recorded. Three or four cases of the same disease appeared amongst the women and children at Hilsea; these were traced to the use of water from a well which had been forbidden, and which has since been closed entirely."

#### Netley.

Surgeon-General Massy, C.B., premises that in consequence of his having so recently assumed charge as Principal Medical Officer of the Royal Victoria Hospital, it was impossible for him to enter into the working and other details of this large establishment from his own practical knowledge.

An abstract of the Registrar's Annual Report and Returns for the year 1876, shows :—

#### I. INVALIDS.

|                  |    |    | Remained,<br>1st Jan.,<br>1876. | Since<br>Joined. | Died. | Discharged.     |                           |                            | Remained,<br>31st Dec.,<br>1876. |
|------------------|----|----|---------------------------------|------------------|-------|-----------------|---------------------------|----------------------------|----------------------------------|
|                  |    |    |                                 |                  |       | In-<br>valided. | To Duty<br>with<br>Corps. | To<br>Lunatic<br>Hospital. |                                  |
| Foreign Stations | .. | .. | 127                             | 2,472            | 38    | 1,377           | 1,125                     | 3                          | 56                               |
| Sent for change  | .. | .. | 4                               | 41               | 2     | 5               | 36                        | 1                          | 1                                |

#### II. EFFECTIVE TROOPS.

|                           | Average<br>Annual<br>Strength. | Remained in<br>Hospital, 1st<br>Jan., 1876. | Since<br>Admitted. | Died. | To Duty. | Invalided. | Remained in<br>Hospital, 31st<br>Dec., 1876. |
|---------------------------|--------------------------------|---------------------------------------------|--------------------|-------|----------|------------|----------------------------------------------|
| Army Hospital Corps .. .. | 131.1                          | 3                                           | 60                 | 4 *   | 53       | 3          | 5                                            |
| Army Service Corps .. ..  | 24                             | 1                                           | 10                 | 1     | 9        | ..         | 1                                            |
| Time Expired Depot .. ..  | 179.9                          | 14                                          | 155                | 5     | 122      | 2          | 40                                           |
| Staff .. ..               | 4                              | ..                                          | ..                 | ..    | ..       | ..         | ..                                           |

\* Two died in Hospital, and two out of Hospital.

*United  
Kingdom.*

"Although there is but little difference in the number of foreign invalids admitted compared with the previous year, viz., 2,270 in 1875 and 2,472 in 1876, the number discharged the service was much greater in the latter than the former, 957 having been found unfit for service in 1875, and 1,377 in 1876.

"The number of deaths was greater in 1875 than 1876; 51 invalids having died in the former year and only 38 in the latter, being in the ratio per 1,000 respectively of 21·77 and 14·62.

"*Arrival of Invalids.*—It would appear that the Indian invalids arrived in 1876, during February, March, April and May, and a few in June, by which the accommodation in the hospital was less severely strained than in some of the previous years, when the arrival of invalids from India was spread over a shorter period; nevertheless, even during 1876, men were disposed of direct from Portsmouth without coming here, in consequence of want of room in this hospital."

"*Army Hospital Corps.*—Since I assumed charge in November last, the Army Hospital Corps has been about thirty below the strength at this station, and the consequence has been that the hospital has not been, in point of cleanliness, tidiness, and regularity, all that I have been accustomed to in military hospitals. Since the termination of the school session the servants of the candidates have been available, and the state of the hospital has improved in these respects."

"*Water supply.*—There has not been any change that I am aware of. I visited the reservoir from which the water for ablution purposes is derived. It is about a mile and a half from the hospital, its chief feeder is a spring about one and a half miles farther; the stream is a small one, and I believe is perennial. I imagine, if the artesian wells in the hospital grounds failed, that the supply could be augmented by some structural alterations from the former source.

"I am informed by the engineer in charge of the water supply, that he can provide 70,000 gallons a day. If this can be provided summer and winter, and the water is at all seasons good, it ought to be enough.

"*Provisions.*—All articles supplied are carefully and regularly inspected. The tea is examined in the laboratory and compared with the approved sample. With the exception of the potatoes, which were for a short time when I first came here not so good as they should have been, all the articles supplied have been since my arrival of excellent quality.

"*Canteen.*—The canteen seems well managed.

"*Cooking.*—This has been unchanged, and seems in all respects satisfactory. I have frequently inspected the cook-house, and the arrangements daily carried out.

"*Drainage.*—I have not discovered anything wrong in this respect, but cannot speak confidently of the details, from the fact that I have not been long enough here to do so.

"*Female Hospital.*—I believe this small building has answered its purpose, but it is not calculated to meet all the requirements of such an institution."

Surgeon-General Massy, adverting to the difficulty of providing accommodation for cases of contagious disease, strongly urges that provision should be made in the estimates for building a new women's hospital, the existing one being appropriated for contagious diseases. In summer all such cases could be placed in tents, but in winter it would be impracticable to do so.

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#### *Northern District.*

Deputy Surgeon-General Fogo reports:—

"The chief causes of sickness in the Northern District during the year have been diseases of the air passages, accidents, and venereal affection.

"Smallpox has given 9 admissions, and considering that the disease has been prevailing for most of the year in the large towns of Manchester and Salford, Liverpool, Preston, Sheffield and Bradford, where troops are stationed, it is a source of satisfaction that so few cases have occurred.

"There have been 4 admissions and 1 death from typhoid fever.

"Some of the barracks and hospitals are of very old construction, barely coming up to the required accommodation, and the necessities of light and ventilation. *United Kingdom.*

"The worst barracks are at Leeds and Sunderland; the worst hospitals at Leeds, Sunderland, Northampton and Burnley.

"The situations in Leeds and Sunderland are objectionable.

"At *Burnley* a new ward is being added to the old hospital.

"At *Northampton* new barracks for the brigade dépôt are just finished, and a new hospital has been included in the estimates for 1878-79.

"At *Newcastle-on-Tyne* two new wards have been added to the old hospital, and the accommodation now is very good.

"At *Carlisle* the garrison cells are very bad from want of ventilation and deficiency of light

"At *Sunderland* nearly everything is bad.

"At *Fleetwood* the school accommodation has been represented as insufficient and insanitary—the room is below the level of the ground. Steps are being taken to provide a new schoolroom.

"At the *Hutment Barracks* a lock-up room is required as additional accommodation to the guard-room.

"At *Weedon* the schoolroom is too small.

"At *Warwick* new barracks and hospital have been occupied by the newly-formed 28th *Dépôt* Brigade.

"At *Liverpool* representations have been made of the want of sufficient latrine and urinal accommodation at *Rupert House* hired barrack, as well as of the very inferior ablution and bath-room.

"At *Chester* improvements have been carried out in the latrines and drains.

"*Diet.*—Now that the Army is composed wholly of young soldiers, it is considered desirable the meat ration should be increased to 1 lb. (inclusive of bone).

"*Water Supply.*—All stations, except *Weedon*, are supplied with water from the local Corporations and Companies.

"Samples of the well water at *Weedon* have been analysed at *Netley*, and proved to be good and wholesome water.

"Samples of the Corporation supply at *Leeds* were also submitted to analysis at *Netley*, but as the results differed from those of a chemist employed by the Corporation, the examination is now being repeated.

"*Gymnasia.*—There are two gymnasia in the Northern District, at *Salford* and *Preston*; the reports from regiments are highly in favour of the training not only for developing the physical condition, but invigorating the constitutional powers of the men."

#### *North British District.*

Deputy Surgeon-General Furlong reports that "there has been no epidemic disease, and that no particular cause of disease has been noticed by medical officers in charge of troops; although there were more men actually sick in 1876, the diseases were of a less fatal character than in 1875.

"Five cases of enteric fever occurred, two at *Piershill*, two (one fatal) at *Glasgow*, and one (fatal) at *Perth*; no connection existed between the cases at the first-named station.

"*Barracks.*—The new married quarters at *Greenlaw* have been finished, they are very complete for comfort and convenience; the hospital, officers' and men's quarters are not yet ready.

"At *Maryhill* some of the men's quarters are occupied; they are very good, but the hospital and remainder of the barracks will not be ready for some time.

"*Piershill.*—Although there is nothing to object to in the sanitary state of the barracks or hospital, there is more sickness at this station than at any other in the Command, except *Glasgow*. I consider the neighbourhood of the works of the *North British Railway*, and of the sewage farm, injurious to the general health.

*United Kingdom.*

*"Leith Fort.*—New married quarters are being built here. A new canteen was completed, also a new urinal in its neighbourhood, and handed over to the troops.

*"Glasgow, Gallowgate Barracks.*—Little can be said in favour of these barracks, and the hospital accommodation is bad ; but the building is to be evacuated for Maryhill eventually.

*"Ayr.*—There are plenty of lavatories, but no bath-room.

*"Paisley.*—These barracks are to be given up when the new ones at Hamilton are ready. The married people are much crowded in barrack rooms ; lodgings scarcely to be procured.

*"Hamilton.*—A new hospital is under construction as well as married quarters ; a new and excellent lavatory has been handed over for barrack use. An old cesspool latrine has been cleaned out and closed.

*"Stirling.*—The married people are still in barrack-rooms ; although there is plenty of space, there are two families in one room separated by curtains.

*"Perth.*—A new hospital is being constructed, and the barracks are being remodelled.

*"Dundee* is occupied by a small detachment ; the hospital is a very good one, and supplied with all conveniences ; it is non-dieted, and in charge of a civil practitioner. The barracks in Claverhouse's house are fair and in an airy situation, though surrounded by factories and chimneys.

*"Fort George.*—A detached latrine has been provided for the hospital, but a covered way to it is required. General improvement has been made to the latrine accommodation of the barracks, but more is still required. A new ablution-room is urgently wanted in the hospital, and those in the barracks require to be remodelled and drained. The ventilation of the east wing of the hospital and of most of the barrack-rooms is defective, particularly in those occupied by the 79th Regiment. There is not really any good water in the fort, but no injurious effects to health have been noticed. The dead-house is not fitted up, and is too close to the hospital ; it would make a good foul linen store, which is much required.

*"Greenlaw* has been occupied by the 62nd Brigade Depot since 31st May, 1876. The hospital is temporary and bad ; the new married quarters are occupied, and the hospital, officers' quarters, &c., will soon be ready.

*"Dunbar.*—Not been occupied since May, 1876, when the Depot removed to Greenlaw.

*"Water.*—Very good ; from distant supply everywhere, except Fort George. The supply is generally ample, the only places at which there appear to be any restrictions are Piershill and Aberdeen.

*"Canteens* have been well supplied ; they appear to be much frequented by the men and their families for food, &c., as well as for malt liquor ; no spirits sold in them.

*"Drainage.*—The ventilation of sewers is being carried out by the Royal Engineers at nearly all the stations, and will shortly be completed.

*"Vicinity of Barracks, &c.*—Except at such stations as Glasgow, Paisley, and perhaps Aberdeen, where the barracks are closely surrounded by houses of the poorer class, factories, &c., the vicinity of the barracks was generally in good sanitary condition. At Maryhill it is feared that the new barracks will be shortly in the midst of factories and houses of a poor class."

#### *Dublin.*

Deputy Surgeon-General Holloway reports :—

"Many grave sanitary defects existing in the Dublin garrison and district during the early part of the year 1876-77, have been discovered and remedied.

"The faulty condition of the drainage of the Royal Barracks has formed the subject of investigation, and plans for revising it are matured. The work will be commenced about the middle of May of the present year.

"A serious defect has been discovered by the officer of Royal Engineers commanding the District. It consisted in the construction of the



latrine of the infant school, Arbour Hill, by which the excreta fell direct into the open sewer at the highest point of the system of drains for the Royal Barracks. Steps are being taken to remedy this. *United Kingdom.*

"There have been many important sanitary improvements during the year, both in the Dublin Garrison and District. The drains and soil-pipes have been ventilated by tubes carried above the eaves of the buildings. Waste-pipes from the latter have been disconnected from the drains; separate cisterns for waterclosets and flushing purposes have been provided; the traps and catch-pits have been revised. These improvements, which are general to the district, have been rapidly and efficiently carried out.

"In Dublin the drains at Aldboro' House, which were in a very bad state, have been thoroughly revised. At Linen Hall Barracks the cess-pit privy for the officers has been converted into a watercloset. The system of drains at the Ship Street Barracks has been rendered very efficient by remodelling the three sewers of this barrack, and conducting them by one channel into the great poddle sewer where they have been efficiently syphoned, the syphon tapped, and a four-inch ventilating pipe inserted, which provides very thoroughly for the egress of air from these drains. At Magazine Fort a cess-pit privy has been converted into a watercloset. The flooring of the huts at Beggar's Bush Barracks has been taken up, the ground examined and found dry and in good order, gratings have been inserted into the hut walls below the floors, ensuring free circulation of air. The latrines at Pigeon House Fort have been reconstructed, and are now on Jennings' principle with flushing apparatus.

"Portobello Barracks have shared in the general improvements made in the garrison. The sanitary condition of this barrack formed the subject of investigation by a board of officers, assembled in March, 1876, who reported very favourably on it. A few defects, consisting of ill-trapped sewers without ventilation, have all been remedied, and I consider this barrack to be in thorough sanitary order. It is at present supplied with canal water from the reservoirs of the Company, but a project for supplying it with Vartry water is now in an advanced stage. At Richmond Barracks Vartry water has been laid on during the year, and nothing remains but the contract to be arranged with the Company before connection is made; I understand that this will be done immediately. At the Royal Barracks, as already stated, the condition of the whole of the drains having been ascertained, arrangements are in progress for clearing out the troops, when the drains will be remodelled throughout.

"At Athlone extensive filtering beds for purifying the water of the Shannon have been constructed, force pumps and tanks supplied, and the barrack supplied with water good and abundant.

"The drains and catch-pits of this barrack have been overhauled and improved.

"The wells at Longford have been revised and made perfect, and water from one of them is now under analysis.

"The married quarters at Mullingar are now nearly ready for occupation, and attempts are being made to improve the water supply by clearing out a large tank and filtering apparatus. Provision has been made in the estimate for another and larger tank for this barrack.

"The married quarters at Birr are finished; a new well has been provided at Castlebar.

"There has been temporary overcrowding at some stations, but this has never been of any duration, nor injurious to health.

"The means of ablution and cooking remain as before, and are on the whole sufficient and satisfactory.

"The effect of gymnasia on the health of troops has been satisfactory.

"Venereal disease is very prevalent, especially in the Dublin Garrison. The Contagious Diseases Act is not in operation; and it is to be regretted that the funds of the Lock Hospital are only adequate for the maintenance of a portion of this valuable institution in working order."

*Belfast District.*

*United  
Kingdom.*

Deputy Surgeon-General Webb reports, that "the most important sanitary defects that came under my notice were at Belfast. The latrines, urinals and ash-pits are much too near the barracks, and there is only one ash-bin or box in the infantry square, for the use of men, averaging 700. Owing to the occurrence of cases of typhoid fever in the barracks at Belfast, a sample of water supplied by the Water Works Company, was forwarded to Netley for chemical analysis, and pronounced by the Professor of Hygiene to be unfit for drinking and cooking purposes, in consequence of which water from the Cromac springs was issued to the troops. Much correspondence, of too bulky a nature to insert here, has taken place with respect to C Block Officers' Quarters, Belfast Barracks, in which two cases of typhoid fever occurred during the year. The house has been vacated, and remains unoccupied until sanitary improvements throughout the building have been effected. Some improvements in the position of bath and ablution room, which could be added on to the Station Hospital at Belfast, would tend very materially to the comfort of the patients. Some improvements might be made at Dundalk, by affording more cubic space in barracks and hospital, and at Newry, by using the corridors, but this would require separate heating apparatus for them.

"A list furnished by the Commanding Royal Engineer shows that there have been many sanitary improvements to buildings, drains, &c., throughout the Command.

"The Gymnasium at Belfast is much used, and no injurious effects have resulted from the training of the soldiers there; on the contrary, all the arrangements seem to conduce to health and strength.

"The chief improvements in the way of new buildings are as follows:—

At *Belfast*, buildings for 30 married soldiers are in the course of erection. An infant school, stores, and bath rooms have been erected in B, C, and D houses.

"*Armagh*.—The hospital, which has been occupied for years as a militia store, will shortly be completed for hospital purposes, and the sick will be removed from huts which they now occupy.

"At *Londonderry*, 24 married soldiers' quarters have been commenced.

"At *Monaghan*, a new ablution shed has been erected."

*Cork District.*

Deputy Surgeon-General Crocker states:—"The reports from the several stations in the District give a satisfactory account of the general health of the troops during the year. The sickness has been mostly of a general character, and, except amongst the children, there has been no prevalence of any epidemic disease. At Fermoy, measles occurred in an epidemic form amongst the families, and 7 cases also appeared among the troops, 5 of which were at Cork. Scarletina also prevailed at different places, though not to the same extent, as only 20 children altogether suffered, and 3 men. In every instance the most stringent regulations were adopted to keep the cases isolated, and hence the spread of the disease was materially checked. Enteric fever, which prevailed at Kinsale to such an extent in the latter part of 1875, has only caused 4 admissions; one of these occurred at Kinsale, and was attributed to the impurity of the drinking water obtained from one of the wells, which has since been closed. In addition to the above, two other cases occurred in Cork Barracks; one of these was the wife of a soldier, and, so far as could be made out, she must have contracted the disease out of barracks; the other was an officer, and this case would appear to owe its origin to a badly trapped drain in the vicinity of his quarters. All the above cases recovered.

"The chief cause of mortality has been phthisis. I alluded last year, when remarking on the prevalence of phthisis, to the overcrowding of barracks that had existed at different times, and I have again to state that at several places in the district the rooms have been occupied in excess of regulation for a longer

or shorter period. Representations have been made at various times of the *United Kingdom* overcrowding, which sometimes it has been possible to remedy, but not always.

A good many sanitary works have been carried out by the Royal Engineer Department, the chief of which are the following:—

“At *Kinsale*, the entire system of drainage has been reconstructed, and earthenware pipes laid down. Several of the barrack-rooms have been provided with additional ventilation, and the old-fashioned open fire grates replaced by Galton's ventilating stoves; baths provided for the ablution room; the old ash-pits removed, and iron bins furnished in their stead. A large block of most comfortable and commodious quarters for married families has also been built.

“At *Charles Fort*, the surface and underground drainage has been reconstructed and an iron ash-bin substituted for the old ash-pit. Earth closets also have been commenced.

“At *Cork*, the sewers have been ventilated by shafts opening above the roofs of the houses, so as to cut off the sewer gas; the same has been carried out at *Limerick* and *Tralee*.

“At *Fermoy*, additional ventilation has been provided for several of the men's rooms.

“At *Templemore* and *Bandon*, new earth closets have been built and the old cess-pits filled in, and the same is now being done at *Kilkenny*.

“In addition to the above, a good many other improvements have been from time to time effected, when the necessity was pointed out.

“*Water Supply*.—The water supply in the district is not altogether satisfactory, more especially at those stations where it is obtained from wells within the barracks. Several samples of water obtained from different sources have been examined by the War Department Chemist, and the Professor of Hygiene at Netley, and found unfit for drinking purposes.

“I think these examples suffice to prove that water obtained from wells in barracks that have been long occupied, and where the old system of drainage prevails, cannot be safely used for drinking, on account of its liability to be contaminated, either by infiltration of surface water or by soakage of sewage matter from drains, but as earth closets are now being generally introduced the latter source of contamination may probably, in course of time, be got rid of. There are, however, several places in the District where the cess-pit system still prevails, but it is to be hoped this may gradually be remedied.”

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#### *Curragh Camp.*

Deputy Surgeon-General Macbeth reports, that “the chief improvements are only in progress, and none of them have yet been quite completed. The ventilation, lighting, and heating of the huts are being gradually altered. It is proposed to reorganise the hospital accommodation, and several improvements have been effected in both station hospitals, notably in No. 2, the ground about which has been enclosed, planted, and laid out in gardens, &c.”

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United  
Kingdom.

### Section II.

#### On the Amount of Invaliding.

The number of non-commissioned officers and men invalided in the force serving in the United Kingdom, and in each arm separately, is shown in the following Table :—

|                |                                  | Troops generally | Household Cavalry. | Cavalry. | Royal Artillery (including the Depot Brigade.) | Foot Guards. | Infantry Regiments. | Depôts. | Royal Engineers. |
|----------------|----------------------------------|------------------|--------------------|----------|------------------------------------------------|--------------|---------------------|---------|------------------|
| Strength .. .. |                                  | 92,781           | 1,205              | 10,689   | 14,918                                         | 5,349        | 40,113              | 9,358   | 3,583            |
| 1876..         | Number discharged as Invalids .. | 2,370            | 20                 | 354      | 370                                            | 106          | 972                 | 418     | 50               |
|                | Ratio per 1,000 ..               | 25·54            | 16·70              | 33·27    | 24·80                                          | 19·82        | 24·23               | 43·51   | 13·96            |
| 1866-75.       | Ratio per 1,000 ..               | 26·45            | 14·48              | 28·27    | 30·19                                          | 21·88        | 25·16               | 44·29   | 15·04            |

For the troops generally, the rate of invaliding is 26 per 1,000 men lower than that of 1876.

### Section III.

#### On the Number constantly in Hospital, of the Troops serving in the United Kingdom.

|                                                                   |         | Troops generally. | Household Cavalry. | Cavalry. | Royal Artillery.* | Foot Guards. | Infantry | Depôt Brigade, Royal Artillery. | Depôts. |
|-------------------------------------------------------------------|---------|-------------------|--------------------|----------|-------------------|--------------|----------|---------------------------------|---------|
| Mean Daily Sick per 1,000 of the strength                         | 1876 .. | 39·60             | 27·71              | 41·97    | 35·55             | 42·94        | 34·22    | 46·24                           | 38·61   |
|                                                                   | 1866-75 | 40·06             | 28·64              | 38·94    | 42·49             | 43·89        | 35·00    | 51·33                           | 41·90   |
| Average Sick time to each Soldier in the course of the Year .. .. | 1876 .. | 14·45             | 10·11              | 15·32    | 12·11             | 15·69        | 12·48    | 16·88                           | 14·09   |
|                                                                   | 1866-75 | 14·62             | 10·45              | 14·22    | 15·51             | 16·02        | 12·77    | 18·73                           | 15·29   |
| Average Duration of each Case of Sickness .. ..                   | 1876 .. | 17·46             | 15·27              | 17·31    | 16·87             | 19·29        | 16·42    | 14·90                           | 16·95   |
|                                                                   | 1866-75 | 17·75             | 17·00              | 18·48    | 17·85             | 22·06        | 17·69    | 17·23                           | 17·30   |

\* Exclusive of the 1st Brigade Royal Artillery.

Compared with the preceding year, all the results are favourable; the proportion of constantly sick is 87 per 1,000 lower, that of the average sick time to each man is 32 per 1,000 lower, and the average duration of each case of sickness is 31 per 1,000 men less. All the results are favourable also for each arm of the service.

## Section IV.

United  
Kingdom.

*On the Influence of Age on the Mortality of the Troops serving in the  
United Kingdom.*

The rates of mortality at different ages (arranged in quinquennial periods), in the several arms of the service, are shown in the following Table:—

| Corps.                                                            | Annual Ratio of Deaths per 1,000 Living,<br>at the following Ages:— |                        |                        |                        |                        |                         |
|-------------------------------------------------------------------|---------------------------------------------------------------------|------------------------|------------------------|------------------------|------------------------|-------------------------|
|                                                                   | Under<br>20.                                                        | 20 and<br>under<br>25. | 25 and<br>under<br>30. | 30 and<br>under<br>35. | 35 and<br>under<br>40. | 40 and<br>up-<br>wards. |
| Household Cavalry .. .. .                                         | ..                                                                  | ..                     | 6·25                   | ..                     | 7·94                   | 12·05                   |
| Cavalry .. .. .                                                   | 1·97                                                                | 5·64                   | 6·59                   | 4·10                   | 12·23                  | 19·56                   |
| Royal Artillery .. .. .                                           | 4·72                                                                | 7·31                   | 3·50                   | 7·74                   | 11·06                  | 35·21                   |
| Foot Guards .. .. .                                               | 1·30                                                                | 7·34                   | 13·05                  | 11·58                  | 14·60                  | 30·30                   |
| Infantry .. .. .                                                  | 2·98                                                                | 3·88                   | 6·42                   | 8·09                   | 15·77                  | 13·22                   |
| Depôt Brigade Royal Artillery, }<br>Depôts and Brigade Depôts.. } | 2·45                                                                | 6·30                   | 5·61                   | 9·14                   | 24·80                  | 22·01                   |
| Ditto, ditto, ditto .. 1866-75                                    | 3·69                                                                | 7·72                   | 11·06                  | 20·39                  | 23·70                  | 24·52                   |
| Average of preceding, exclusive of }<br>all Depôts .. .. . }      | 2·99                                                                | 4·95                   | 6·53                   | 8·17                   | 14·57                  | 18·86                   |
| Ditto, ditto .. .. 1866-75                                        | 3·04                                                                | 5·31                   | 6·51                   | 12·17                  | 17·53                  | 23·95                   |
| Civil Male Population { England and Wales ..                      | 7·41                                                                | 8·42                   | 9·21                   | 10·23                  | 11·63                  | 13·55                   |
| { Healthy Districts ..                                            | 5·83                                                                | 7·30                   | 7·93                   | 8·36                   | 9·00                   | 9·86                    |

*United  
Kingdom.*

*Section V.*

*On the Recruiting of the Army.*

The annual medical reports show that 41,809 recruits were inspected in 1876; of these, 30,787 were examined by Army Medical Officers and 11,022 by Civil Medical Practitioners. The rejections on primary inspection amounted to 10,369, and on secondary inspection to 1,050, making a total of 11,419, or 273·12 per 1,000 of the number examined; the proportion of rejections being 15·68 per 1,000 higher than in 1875.

The following Table shows the numbers inspected and rejected, and the ratios of rejections per 1,000 examined:—

|                                   | Number of Recruits<br>Primarily Inspected. | Number Rejected.          |                             |        | Ratio of Rejections per 1,000 Inspected. |                                               |
|-----------------------------------|--------------------------------------------|---------------------------|-----------------------------|--------|------------------------------------------|-----------------------------------------------|
|                                   |                                            | On Primary<br>Inspection. | On Secondary<br>Inspection. | Total. | Primary<br>Inspections.                  | Both Primary<br>and Secondary<br>Inspections. |
| By Army Medical Officers ..       | 30,787                                     | 8,485                     | } 1050                      | 11,419 | 275·60                                   | 273·12                                        |
| By Civil Medical Practitioners .. | 11,022                                     | 1,884                     |                             |        | 170·93                                   |                                               |
| Total ..                          | 41,809                                     | 10,369                    | 1050                        | 11,419 | 248·01                                   | 273·12                                        |

The proportion of rejections on primary examination both by Medical Officers of the Army and Civil Medical Practitioners is higher than in 1875.

The native countries of the recruits, the ratios of rejections, and the proportion per 1,000 furnished by each country, are given in the following Table:—

| Native Countries of<br>Recruits.                 | Examined<br>by<br>Army Medical<br>Officers. |           | Examined<br>by Civil<br>Medical<br>Practitioners. |           | Rejected on Secondary<br>Inspection. | Total.               |                                                        | Proportion Rejected per 1,000<br>Inspected. | Proportion per 1,000 of Re-<br>cruits furnished by each<br>Country. |
|--------------------------------------------------|---------------------------------------------|-----------|---------------------------------------------------|-----------|--------------------------------------|----------------------|--------------------------------------------------------|---------------------------------------------|---------------------------------------------------------------------|
|                                                  | Inspected.                                  | Rejected. | Inspected.                                        | Rejected. |                                      | Primarily Inspected. | Rejected at Primary<br>and Secondary In-<br>spections. |                                             |                                                                     |
| England and Wales...                             | 20,968                                      | 5,739     | 9,191                                             | 1619      | 812                                  | 30,159               | 8,170                                                  | 270·90                                      | 721·4                                                               |
| Scotland ... ..                                  | 3,388                                       | 967       | 489                                               | 70        | 89                                   | 3,877                | 1,126                                                  | 290·43                                      | 92·7                                                                |
| Ireland ... ..                                   | 6,130                                       | 1,716     | 1314                                              | 193       | 145                                  | 7,444                | 2,054                                                  | 275·93                                      | 178·0                                                               |
| British Colonies and }<br>Foreign Countries....} | 801                                         | 63        | 28                                                | 2         | 4                                    | 829                  | 69                                                     | 209·72                                      | 7·9                                                                 |
| Total ..                                         | 30,787                                      | 8,485     | 11,022                                            | 1884      | 1,050                                | 41,809               | 11,419                                                 | 273·12                                      | 1000·0                                                              |

The rate of rejections is higher for recruits born in the United Kingdom, and lower for those born abroad than in 1875. The proportions per 1,000 of recruits furnished by England and Ireland are greater, and by Scotland and foreign countries less, than in the preceding year.

The following Table shows the number of recruits inspected for each arm *United* of the service, the number rejected, the ratios of rejections, and the proportion *Kingdom*. per 1,000 inspected for each arm of the service :—

| Arms of the Service.                      | Examined<br>by<br>Army Medical<br>Officers. |           | Examined<br>by Civil<br>Medical<br>Practitioners. |           | Total<br>Primary<br>Inspections. |           | Rejected at Secondary In-<br>spection. | Total Rejected at Primary<br>and Secondary Inspections. | Ratio of Rejections per 1,000<br>of Recruits Inspected. | Proportion per 1,000 of Re-<br>cruits examined for each<br>Arm. |
|-------------------------------------------|---------------------------------------------|-----------|---------------------------------------------------|-----------|----------------------------------|-----------|----------------------------------------|---------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------|
|                                           | Inspected.                                  | Rejected. | Inspected.                                        | Rejected. | Inspected.                       | Rejected. |                                        |                                                         |                                                         |                                                                 |
| Household Cavalry ... ..                  | 260                                         | 72        | 2                                                 | ...       | 262                              | 72        | ...                                    | 72                                                      | 274·81                                                  | 6·3                                                             |
| Cavalry of the Line ... ..                | 3,439                                       | 832       | 465                                               | 74        | 3,904                            | 906       | 27                                     | 933                                                     | 238·99                                                  | 93·4                                                            |
| Royal Artillery ... ..                    | 5,916                                       | 1,579     | 2,103                                             | 246       | 8,019                            | 1,825     | 174                                    | 1,999                                                   | 249·2                                                   | 191·8                                                           |
| Royal Engineers ... ..                    | 851                                         | 217       | 27                                                | 3         | 878                              | 220       | ...                                    | 220                                                     | 250·57                                                  | 21·0                                                            |
| Foot Guards ... ..                        | 765                                         | 236       | 981                                               | 221       | 1,746                            | 457       | 237                                    | 694                                                     | 397·48                                                  | 41·7                                                            |
| Infantry and Departmental<br>Corps ... .. | 10,556                                      | 5,549     | 7,444                                             | 1340      | 27,000                           | 6,889     | 612                                    | 7,501                                                   | 277·31                                                  | 645·8                                                           |
| Total ... ..                              | 30,787                                      | 8,485     | 11,022                                            | 1,884     | 41,809                           | 10,369    | 1,050                                  | 11,419                                                  | 273·12                                                  | 1000·0                                                          |

The rate of rejections is much lower for the Household Cavalry and Royal Engineers, and a little lower for the Foot Guards, than in the preceding year ; in the other arms it is higher. The Foot Guards again show the highest, and the Cavalry of the Line the lowest proportion of rejections.

United  
Kingdom.

Table showing the number of recruits rejected in 1876, with the causes of rejection arranged in classes, and the ratio per 1,000 in each class :—

| Numbers inspected.                                                                 | Recruits Rejected on Primary Inspection. |                           |                                          |                           |                   |                           | Rejections on Secondary Inspection. | Total Rejections on Primary and Secondary Inspections. |                           |
|------------------------------------------------------------------------------------|------------------------------------------|---------------------------|------------------------------------------|---------------------------|-------------------|---------------------------|-------------------------------------|--------------------------------------------------------|---------------------------|
|                                                                                    | Examined by Army Medical Officers.       |                           | Examined by Civil Medical Practitioners. |                           | Total.            |                           |                                     | Numbers Rejected.                                      | Ratio per 1,000 Rejected. |
|                                                                                    | 30,787                                   |                           | 11,022                                   |                           | 41,809            |                           |                                     |                                                        |                           |
| Causes of Rejections, in Classes.                                                  | Numbers Rejected.                        | Ratio per 1,000 Rejected. | Numbers Rejected.                        | Ratio per 1,000 Rejected. | Numbers Rejected. | Ratio per 1,000 Rejected. |                                     | Numbers Rejected.                                      | Ratio per 1,000 Rejected. |
| 1. Syphilis ... ..                                                                 | 462                                      | 15·01                     | 123                                      | 11·16                     | 585               | 13·99                     | 49                                  | 634                                                    | 15·16                     |
| 2. Scrofula ... ..                                                                 | 175                                      | 5·68                      | 37                                       | 3·36                      | 212               | 5·07                      | 10                                  | 222                                                    | 5·31                      |
| 3. Phthisis ... ..                                                                 | 123                                      | 4·00                      | 76                                       | 6·90                      | 199               | 4·76                      | 22                                  | 221                                                    | 5·29                      |
| 4. Impaired Constitution ... ..                                                    | 262                                      | 8·51                      | 58                                       | 5·26                      | 320               | 7·65                      | 34                                  | 354                                                    | 8·47                      |
| 5. Muscular Tenuity and Debility... ..                                             | 1,382                                    | 44·89                     | 148                                      | 13·43                     | 1,530             | 36·60                     | 166                                 | 1,696                                                  | 40·57                     |
| 6. Other General Diseases ... ..                                                   | 79                                       | 2·57                      | 18                                       | 1·63                      | 97                | 2·32                      | 13                                  | 110                                                    | 2·63                      |
| 7. Diseases of Nervous System ... ..                                               | 51                                       | 1·66                      | 8                                        | ·72                       | 59                | 1·41                      | 7                                   | 66                                                     | 1·58                      |
| 8. Weakness of Intellect ... ..                                                    | 64                                       | 2·08                      | 1                                        | ·09                       | 65                | 1·55                      | 17                                  | 82                                                     | 1·96                      |
| 9. Defective Vision ... ..                                                         | 1,419                                    | 46·09                     | 312                                      | 28·31                     | 1,731             | 41·40                     | 181                                 | 1,862                                                  | 44·54                     |
| 10. Diseases of Eyes and Eyelids ... ..                                            | 116                                      | 3·77                      | 15                                       | 1·36                      | 131               | 3·13                      | 26                                  | 156                                                    | 3·73                      |
| 11. Diseases of Nose and Mouth ... ..                                              | 16                                       | ·52                       | 1                                        | ·09                       | 17                | ·41                       | 1                                   | 18                                                     | ·43                       |
| 12. Disease of Ears ... ..                                                         | 14                                       | ·45                       | 1                                        | ·09                       | 15                | ·36                       | 1                                   | 16                                                     | ·38                       |
| 13. Deafness ... ..                                                                | 72                                       | 2·34                      | 6                                        | ·54                       | 78                | 1·87                      | 7                                   | 85                                                     | 2·03                      |
| 14. Impediment of Speech ... ..                                                    | 47                                       | 1·53                      | 3                                        | ·27                       | 50                | 1·20                      | 11                                  | 61                                                     | 1·46                      |
| 15. Disease of Heart ... ..                                                        | 646                                      | 20·98                     | 130                                      | 11·80                     | 776               | 18·56                     | 117                                 | 893                                                    | 21·36                     |
| 16. Disease of Arteries (Aneurism) ... ..                                          | 3                                        | ·10                       | 1                                        | ·09                       | 4                 | ·10                       | 4                                   | 8                                                      | ·19                       |
| 17. Disease of Veins (Varix) ... ..                                                | 580                                      | 18·84                     | 189                                      | 17·15                     | 769               | 18·39                     | 48                                  | 817                                                    | 19·54                     |
| 18. Diseases of Lungs (except Phthisis) ... ..                                     | 62                                       | 2·01                      | 9                                        | ·82                       | 71                | 1·70                      | 16                                  | 87                                                     | 2·08                      |
| 19. Loss or Decay of Teeth ... ..                                                  | 239                                      | 7·76                      | 42                                       | 3·81                      | 281               | 6·72                      | 23                                  | 304                                                    | 7·27                      |
| 20. Hernia ... ..                                                                  | 267                                      | 8·67                      | 114                                      | 10·34                     | 381               | 9·11                      | 33                                  | 414                                                    | 9·90                      |
| 21. Laxity of Abdominal Rings ... ..                                               | 139                                      | 4·51                      | 37                                       | 3·36                      | 176               | 4·21                      | 13                                  | 189                                                    | 4·52                      |
| 22. Hemorrhoids ... ..                                                             | 91                                       | 2·96                      | 26                                       | 2·36                      | 117               | 2·80                      | 16                                  | 133                                                    | 3·18                      |
| 23. Diseases of Urinary Organs ... ..                                              | 25                                       | ·81                       | 12                                       | 1·09                      | 37                | ·89                       | 2                                   | 39                                                     | ·93                       |
| 24. Varicocele ... ..                                                              | 382                                      | 12·41                     | 173                                      | 15·70                     | 555               | 13·27                     | 32                                  | 587                                                    | 14·04                     |
| 25. Other Diseases of the Genital Organs (not Syphilitic) ... ..                   | 88                                       | 2·86                      | 20                                       | 1·82                      | 109               | 2·58                      | 2                                   | 110                                                    | 2·63                      |
| 26. Defects of Upper Extremities, from Fracture, Contraction, Luxation, &c. ... .. | 254                                      | 8·25                      | 32                                       | 2·90                      | 286               | 6·84                      | 45                                  | 331                                                    | 7·92                      |
| 27. Defects of Lower Extremities, from Fracture, Contraction, Luxation, &c. ... .. | 307                                      | 9·97                      | 74                                       | 6·71                      | 381               | 9·11                      | 59                                  | 440                                                    | 10·52                     |
| 28. Flat Feet ... ..                                                               | 150                                      | 4·87                      | 33                                       | 2·99                      | 183               | 4·38                      | 33                                  | 216                                                    | 5·17                      |
| 29. Diseases of Joints ... ..                                                      | 76                                       | 2·47                      | 3                                        | ·27                       | 79                | 1·89                      | 10                                  | 89                                                     | 2·13                      |
| 30. Other Affections of Bones and Muscles ... ..                                   | 54                                       | 1·75                      | 7                                        | ·64                       | 61                | 1·46                      | 10                                  | 71                                                     | 1·70                      |
| 31. Ulcers, Wounds, and Cicatrices ... ..                                          | 211                                      | 6·85                      | 23                                       | 2·54                      | 239               | 5·72                      | 19                                  | 258                                                    | 6·17                      |
| 32. Other Affections of the Cutaneous System ... ..                                | 163                                      | 5·29                      | 54                                       | 4·90                      | 217               | 5·19                      | 8                                   | 225                                                    | 5·38                      |
| 33. Malformation of Ears ... ..                                                    | ...                                      | ...                       | ...                                      | ...                       | ...               | ...                       | ...                                 | ...                                                    | ...                       |
| 34. " " Nose and Mouth ... ..                                                      | 7                                        | ·23                       | ...                                      | ...                       | 7                 | ·17                       | 1                                   | 8                                                      | ·19                       |
| 35. " " Chest and Spine ... ..                                                     | 352                                      | 11·43                     | 87                                       | 7·89                      | 439               | 10·50                     | 45                                  | 484                                                    | 11·58                     |
| 36. " " Urin. or Gen. Organs ... ..                                                | 15                                       | ·49                       | 2                                        | ·18                       | 17                | ·41                       | 1                                   | 18                                                     | ·43                       |
| 37. Marks of Punishment, or letter D. or B.C. ... ..                               | 23                                       | ·75                       | 1                                        | ·09                       | 24                | ·57                       | 4                                   | 28                                                     | ·67                       |
| 38. Marks of Cupping, Blistering, &c. ... ..                                       | 51                                       | 1·66                      | 3                                        | ·27                       | 54                | 1·29                      | 15                                  | 69                                                     | 1·65                      |
| 39. Unknown ... ..                                                                 | 18                                       | ·58                       | ...                                      | ...                       | 18                | ·43                       | ...                                 | 18                                                     | ·43                       |
| Total Rejected ... ..                                                              | 8,485                                    | 275·60                    | 1,884                                    | 170·93                    | 10,369            | 248·01                    | 1050                                | 11,419                                                 | 273·12                    |



The chief causes of rejection were syphilis, impaired constitution, muscular *United* tenuity, defective vision, diseases of the heart, diseases of the veins, loss of *Kingdom.* teeth, hernia, varicocele, defects of the upper and lower extremities, ulcers, wounds, &c., and malformation of the chest and spine.

When compared with last year's returns, there is a decrease observed in the ratios of rejections for muscular tenuity, diseases of the eyes, arteries, lungs (except phthisis), and urinary system, hernia, flat feet, diseases of the joints, other affections of bones and muscles, and malformation of the chest and spine; and an increase in all the other classes. The highest ratio of rejections is, as in 1875, or defective vision.

Table showing the ages of all recruits, as given at their primary inspection, and the proportion per 10,000 at each age:—

| Ages.                | Numbers Inspected.        |                                 |        | Proportion in 10,000.              |                                          |        |
|----------------------|---------------------------|---------------------------------|--------|------------------------------------|------------------------------------------|--------|
|                      | By Army Medical Officers. | By Civil Medical Practitioners. | Total. | Examined by Army Medical Officers. | Examined by Civil Medical Practitioners. | Total. |
| Boys under 17 .. ..  | 741                       | 42                              | 783    | 241                                | 38                                       | 187    |
| From 17 to 18 .. ..  | 727                       | 100                             | 827    | 236                                | 91                                       | 198    |
| „ 18 to 19 .. ..     | 7,628                     | 2,721                           | 10,344 | 2,476                              | 2,469                                    | 2,474  |
| „ 19 to 20 .. ..     | 6,465                     | 2,460                           | 8,945  | 2,100                              | 2,250                                    | 2,139  |
| „ 20 to 21 .. ..     | 3,673                     | 1,458                           | 5,131  | 1,193                              | 1,323                                    | 1,227  |
| „ 21 to 22 .. ..     | 2,902                     | 1,128                           | 4,030  | 943                                | 1,023                                    | 964    |
| „ 22 to 23 .. ..     | 2,367                     | 922                             | 3,289  | 769                                | 837                                      | 787    |
| „ 23 to 24 .. ..     | 1,968                     | 690                             | 2,658  | 639                                | 626                                      | 636    |
| „ 24 to 25 .. ..     | 2,062                     | 719                             | 2,801  | 676                                | 652                                      | 670    |
| 25 and upwards .. .. | 2,239                     | 762                             | 3,001  | 727                                | 691                                      | 718    |
| Total .. ..          | 30,787                    | 11,022                          | 41,809 | 10,000                             | 10,000                                   | 10,000 |

Of every 10,000 recruits examined for the service, 5,099 were under 20 years of age; the proportion under this age is less than last year by 285, and the rates at all the ages (below 20 years) except between 17 and 18, are lower. At the higher ages (above 20 years) the proportion of recruits between 24 and 25 years is a little and at 25 years is much larger; the increase at the latter age being due to the extension of age, to 30 years, in the case of short service men.

Table showing the heights of recruits, and the proportion per 10,000 at each height:—

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| Heights. |               |   | Number Inspected.         |                                 |        | Proportion in 10,000.              |                                          |        |
|----------|---------------|---|---------------------------|---------------------------------|--------|------------------------------------|------------------------------------------|--------|
|          |               |   | By Army Medical Officers. | By Civil Medical Practitioners. | Total. | Examined by Army Medical Officers. | Examined by Civil Medical Practitioners. | Total. |
| Ft. In.  | Ft. In.       |   |                           |                                 |        |                                    |                                          |        |
| 5        | Under 5       | 3 | 702                       | 39                              | 741    | 228                                | 35                                       | 177    |
| 5        | 3 to 5        | 4 | 214                       | 13                              | 227    | 69                                 | 12                                       | 54     |
| 5        | 4 "           | 5 | 4,726                     | 1,293                           | 6,019  | 1,535                              | 1,173                                    | 1,440  |
| 5        | 5 "           | 5 | 7,825                     | 3,012                           | 10,837 | 2,542                              | 2,733                                    | 2,592  |
| 5        | 6 "           | 5 | 6,178                     | 2,430                           | 8,608  | 2,007                              | 2,205                                    | 2,059  |
| 5        | 7 "           | 5 | 5,203                     | 1,992                           | 7,195  | 1,690                              | 1,807                                    | 1,721  |
| 5        | 8 "           | 5 | 2,988                     | 1,119                           | 4,107  | 970                                | 1,015                                    | 982    |
| 5        | 9 "           | 5 | 1,638                     | 635                             | 2,273  | 532                                | 576                                      | 544    |
| 5        | 10 "          | 5 | 698                       | 298                             | 996    | 227                                | 270                                      | 238    |
| 5        | 11 "          | 6 | 366                       | 136                             | 502    | 119                                | 124                                      | 120    |
| 6        | 0 and upwards |   | 249                       | 55                              | 304    | 81                                 | 50                                       | 73     |
| Total .. |               |   | 30,787                    | 11,022                          | 41,809 | 10,000                             | 10,000                                   | 10,000 |

The proportion per 10,000 of recruits between 5 ft. 4 in. and 5 ft. 5 in. is much, and between 5 ft. 11 in. and 6 ft. is a little greater than in 1875 ; at each of the other heights it is less. There is an increase over last year of 385 per 10,000 recruits measuring under 5 ft. 6 in. ; the increase below this height is due to the reduction of the standard, and is confined to the recruits measuring between 5 ft. 4 in. and 5 ft. 5 in.

Table showing the weights of recruits inspected by Army Medical Officers, and the proportion per 10,000 at each weight. There is no information of this kind available respecting those primarily inspected by Civil Medical Practitioners, or by Army Medical Officers at many of the smaller stations.

| Weights.   |      |     |    |    | Numbers Weighed. | Proportion per 10,000. |
|------------|------|-----|----|----|------------------|------------------------|
| lbs.       | lbs. |     |    |    |                  |                        |
| Under      | ..   | 100 | .. | .. | 430              | 219                    |
| 100        | to   | 110 | .. | .. | 207              | 105                    |
| 110        | to   | 120 | .. | .. | 2,324            | 1,182                  |
| 120        | to   | 130 | .. | .. | 5,240            | 2,665                  |
| 130        | to   | 140 | .. | .. | 5,627            | 2,862                  |
| 140        | to   | 150 | .. | .. | 3,509            | 1,784                  |
| 150        | to   | 160 | .. | .. | 1,486            | 766                    |
| 160        | to   | 170 | .. | .. | 568              | 289                    |
| Upwards of | 170  |     | .. | .. | 271              | 138                    |
| Total ..   |      |     |    |    | 19,662           | 10,000                 |

The proportions weighing under 100 lbs., from 130 to 140 lbs., and from 140 lbs. to 150 lbs. are less, those from 120 to 130 almost identical, and at the other weights greater than in 1875. The recruits weighing over 130 lbs. are in excess of those who were beyond that weight last year by 57 per 10,000.

The state of education of recruits primarily inspected by Army Medical Officers is shown in the following Table. There is no information available on this head respecting those examined by Civil Medical Practitioners:—

|                                | Numbers examined. | Ratio per 1,000. |
|--------------------------------|-------------------|------------------|
| Unable to read .. .. .         | 5,520             | 179·3            |
| Able to read only .. .. .      | 2,828             | 91·9             |
| Able to read and write .. .. . | 22,439            | 728·8            |
| Total .. .. .                  | 30,787            | 1000·0           |

The proportion of recruits unable to read is higher than last year, of those able to read and write lower, while that of those able to read only is almost identical.

The occupations of recruits before enlistment, the proportions rejected, and furnished by each group, are shown in the following Table:—

| Occupations of Recruits.                                                                                             | Number Inspected. | Rejected at Primary Inspection. | Rejected at Secondary Inspection. | Total Rejected. | Ratio per 1,000 Rejected. | Proportion per 1,000 of recruits furnished by each group of occupations. |
|----------------------------------------------------------------------------------------------------------------------|-------------------|---------------------------------|-----------------------------------|-----------------|---------------------------|--------------------------------------------------------------------------|
| 1. Labourers, Servants, Husbandmen, &c. .. .. .                                                                      | 25,507            | 6,179                           | 651                               | 6,830           | 267·77                    | 610·1                                                                    |
| 2. Manufacturing Artisans (as Clothworkers, Weavers, Lace Makers, &c.) .. .. .                                       | 5,023             | 1,384                           | 130                               | 1,514           | 301·41                    | 120·2                                                                    |
| 3. Mechanics employed in Occupations favourable to physical development (as Smiths, Carpenters, Masons, &c.) .. .. . | 7,300             | 1,889                           | 212                               | 2,101           | 287·81                    | 174·6                                                                    |
| 4. Shopmen and Clerks .. .. .                                                                                        | 2,853             | 790                             | 52                                | 842             | 295·13                    | 68·2                                                                     |
| 5. Professional Occupations, Students, &c. .. .. .                                                                   | 343               | 65                              | 4                                 | 69              | 201·17                    | 8·2                                                                      |
| 6. Boys under 17 years of age .. .. .                                                                                | 783               | 62                              | 1                                 | 63              | 80·46                     | 18·7                                                                     |
| Total .. .. .                                                                                                        | 41,809            | 10,369                          | 1,050                             | 11,419          | 273·12                    | 1000·0                                                                   |

The ratios of rejections are higher in all the groups, except "Boys under 17 years of age" than in 1875. "Manufacturing Artizans," again, show the highest rate of rejections, and "Boys under 17" the lowest. The proportions of men, under the two first headings, offering themselves for the service are higher, under the third almost identical, and under the last three lower than in the preceding year.

### III. ON THE HEALTH OF THE TROOPS SERVING IN THE MEDITERRANEAN COMMANDS.

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#### *Section I.—Sickness and Mortality.*

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#### I.—GIBRALTAR.

##### STATISTICAL REPORT.

*Gibraltar.* The average annual strength of the force at Gibraltar was 4,695, non-commissioned officers and men, amongst whom there were 3,129 admissions into hospital, and (including those of invalids who died on the passage or after arrival at home) 36 deaths; the average number of constantly sick was 175·60; the proportions given by these numbers are 66·3, 7·67, and 37·40 per 1,000 of the strength, respectively. The rate of admissions exceeds that of the preceding year by 45·4 per 1,000 men; the rate of deaths is 2·17 per 1,000 higher; the rate of constantly sick is fractionally lower.

The corps which served at Gibraltar in the year, and some of the most important of their health statistics, are shown in the following Table:—

# REPORT FOR 1876.

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Gibraltar.

| Corps.                          | Completed years of service in Command. | Average Annual Strength. | Admissions into Hospital. | Died.         |           |        | Invalids sent Home. | Average Daily Sick. | Rate per 1,000 of strength. |         |           |             | Average sick time to each Soldier. | Average duration of cases of sickness. |
|---------------------------------|----------------------------------------|--------------------------|---------------------------|---------------|-----------|--------|---------------------|---------------------|-----------------------------|---------|-----------|-------------|------------------------------------|----------------------------------------|
|                                 |                                        |                          |                           | At Gibraltar. | Invalids. | Total. |                     |                     | Admissions.                 | Deaths. | Invalids. | Daily Sick. |                                    |                                        |
| 17th Brigade Royal Artillery .. | 2                                      | 978                      | 614                       | 9             | ..        | 9      | 10                  | 45.9                | 627.8                       | 9.20    | 10.23     | 46.93       | Days.<br>17.13                     | Days.<br>27.29                         |
| Royal Engineers ..              | ..                                     | 353                      | 321                       | 1             | 1         | 2      | 2                   | 12.5                | 909.3                       | 5.67    | 5.67      | 35.41       | 12.92                              | 14.21                                  |
| 1st Battalion 4th Foot ..       | 2                                      | 666                      | 304                       | 4             | 2         | 6      | 3                   | 14.5                | 456.4                       | 9.01    | 4.50      | 21.77       | 7.95                               | 17.41                                  |
| 2nd " 23rd " ..                 | 2                                      | 665                      | 381                       | 1             | ..        | 1      | 4                   | 20.8                | 572.9                       | 1.50    | 6.01      | 31.28       | 11.42                              | 19.93                                  |
| *31st Foot ..                   | 8                                      | 190                      | 83                        | 1             | ..        | 1      | 3                   | 7.0                 | 436.9                       | 5.26    | 15.80     | 36.84       | 13.45                              | 30.08                                  |
| 69th " ..                       | 3                                      | 631                      | 422                       | 4             | ..        | 4      | 5                   | 21.6                | 688.8                       | 6.34    | 7.92      | 34.23       | 12.49                              | 18.68                                  |
| †102nd " ..                     | ..                                     | 449                      | 537                       | 10            | ..        | 10     | ..                  | 26.7                | 1196.0                      | 22.27   | ..        | 59.47       | 21.70                              | 18.15                                  |
| 2nd Battalion Rifle Brigade ..  | 2                                      | 652                      | 388                       | 2             | ..        | 2      | 11                  | 22.8                | 595.1                       | 3.07    | 16.87     | 34.97       | 12.76                              | 21.45                                  |
| Army Service Corps ..           | ..                                     | 60                       | 36                        | ..            | ..        | ..     | 1                   | 1.6                 | ..                          | ..      | ..        | ..          | ..                                 | ..                                     |
| Army Hospital Corps ..          | ..                                     | 43                       | 42                        | 1             | ..        | 1      | ..                  | 2.2                 | 711.8                       | 9.00    | 9.00      | 34.24       | 12.80                              | 17.56                                  |
| Garrison Staff ..               | ..                                     | 8                        | 1                         | ..            | ..        | ..     | ..                  | ..                  | ..                          | ..      | ..        | ..          | ..                                 | ..                                     |

\* Left the Command in April. † Arrived in the Command in April.

*Gibraltar.*

As regards the prevalence of sickness, it will be seen that the proportion for the 102nd Regiment, which arrived at the station in the second quarter of the year, is nearly double the average, the admissions into hospital exceeding the mean strength of the corps; the death-rate is also more than double that of any other, and is nearly three times as great as the average for all corps. The admissions for the diseases in the *febrile group* are in a higher rate than for any other corps, and rheumatism also contributed to the disproportionate amount of sickness in the regiment; its mortality was very slightly influenced by the prevalence of fevers, one death only being returned in the group; half of the deaths being due to diseases of the heart and blood vessels, namely, 1 to valve disease of the heart, and 4 to aneurism.

The classes and orders of diseases by which the sickness and mortality in the Command was caused, are shown in the following Table:—

| Orders. | Diseases.                              | 1876.<br>Average Annual Strength, 4,695. |               |              |        |                                           |       | 1869-75.                                  |       |
|---------|----------------------------------------|------------------------------------------|---------------|--------------|--------|-------------------------------------------|-------|-------------------------------------------|-------|
|         |                                        | Admitted into<br>Hospital.               | Deaths.       |              |        | Annual ratio<br>per 1,000 of<br>Strength. |       | Annual ratio<br>per 1,000 of<br>Strength. |       |
|         |                                        |                                          | At Gibraltar. | Of Invalids. | Total. | Admitted.                                 | Died. | Admitted.                                 | Died. |
|         |                                        |                                          |               |              |        |                                           |       |                                           |       |
|         | <b>I. General Diseases.</b>            |                                          |               |              |        |                                           |       |                                           |       |
| 1       | Febrile Group ..                       | 636                                      | 10            | ..           | 10     | 135·6                                     | 2·13  | 88·9                                      | 1·44  |
| 2       | Constitutional „ ..                    | 590                                      | 7             | 3            | 10     | 125·7                                     | 2·13  | 105·0                                     | 1·41  |
|         | <b>II. Local Diseases.</b>             |                                          |               |              |        |                                           |       |                                           |       |
|         | Diseases of the—                       |                                          |               |              |        |                                           |       |                                           |       |
| 1       | Nervous System ..                      | 21                                       | ..            | ..           | ..     | 4·5                                       | ..    | 7·2                                       | ·26   |
| 2       | Eye .. ..                              | 56                                       | ..            | ..           | ..     | 11·9                                      | ..    | 18·2                                      | ..    |
| 3       | Ear .. ..                              | 23                                       | ..            | ..           | ..     | 4·9                                       | ..    | 3·6                                       | ..    |
| 4       | Nose .. ..                             | ..                                       | ..            | ..           | ..     | ..                                        | ..    | ·7                                        | ..    |
| 5       | Circulatory System ..                  | 40                                       | 9             | ..           | 9      | 8·5                                       | 1·92  | 11·1                                      | ·93   |
| 6       | Absorbent „ ..                         | 22                                       | ..            | ..           | ..     | 4·7                                       | ..    | 4·2                                       | ..    |
| 7       | Ductless Glands ..                     | ..                                       | ..            | ..           | ..     | ..                                        | ..    | ·1                                        | ..    |
| 8       | Respiratory System ..                  | 193                                      | 3             | ..           | ..     | 41·1                                      | ·64   | 43·9                                      | ·77   |
| 9       | Digestive „ ..                         | 412                                      | ..            | ..           | ..     | 87·3                                      | ..    | 82·3                                      | ·19   |
| 10      | Urinary „ ..                           | 201                                      | 1             | ..           | 1      | 42·8                                      | ·21   | 66·8                                      | ·32   |
| 11      | Generative „ ..                        | 56                                       | ..            | ..           | ..     | 11·9                                      | ..    | 14·3                                      | ..    |
| 12      | Organs of Locomotion ..                | 20                                       | ..            | ..           | ..     | 4·3                                       | ..    | 5·0                                       | ·06   |
| 13      | Cellular Tissue ..                     | 78                                       | ..            | ..           | ..     | 16·6                                      | ..    | 14·0                                      | ..    |
| 14      | Cutaneous System ..                    | 190                                      | ..            | ..           | ..     | 40·7                                      | ..    | 61·4                                      | ..    |
|         | <b>III. Conditions, &amp;c.</b>        |                                          |               |              |        |                                           |       |                                           |       |
|         | Debility .. ..                         | 78                                       | ..            | ..           | ..     | 16·6                                      | ..    | 5·3                                       | ..    |
|         | <b>IV. Poisons ..</b>                  | 68                                       | ..            | ..           | ..     | 14·5                                      | ..    | 7·3                                       | ·16   |
|         | <b>V. Injuries.</b>                    |                                          |               |              |        |                                           |       |                                           |       |
| 2       | Accidental .. ..                       | 438                                      | 3             | ..           | 3      | 93·3                                      | ·64   | 92·0                                      | ·42   |
| 4       | Self-inflicted .. ..                   | 1                                        | ..            | ..           | ..     | ·2                                        | ..    | ·2                                        | ·19   |
|         | <b>VI. Surgical Operations.</b>        |                                          |               |              |        |                                           |       |                                           |       |
|         | No appreciable disease ..              | 6                                        | ..            | ..           | ..     | 1·3                                       | ..    | 1·1                                       | ..    |
|         | <b>Total .. ..</b>                     | 3,129                                    | 33            | 3            | 36     | 666·4                                     | 7·67  | 632·7                                     | 6·18  |
|         | <b>Average of 10 Years<br/>1866-75</b> | } ..                                     | ..            | ..           | ..     | 654·0                                     | 6·87  | ..                                        | ..    |

*General Diseases.* The rate of admissions exceeds that of the preceding *Gibraltar* year by 23·2 per 1,000 men; the increase is contributed to by both groups of the class. The rate of mortality is 1·50 per 1,000 men higher, and the increase occurs in both groups.

The admissions and deaths from the principal diseases in this class are shown in the following Table :—

| General Diseases.               | 1876.     |       | Annual Ratio per 1000 of Strength. |       |           |       |
|---------------------------------|-----------|-------|------------------------------------|-------|-----------|-------|
|                                 | Admitted. | Died. | 1876.                              |       | 1869-75.  |       |
|                                 |           |       | Admitted.                          | Died. | Admitted. | Died. |
| <i>Febrile—</i>                 |           |       |                                    |       |           |       |
| Eruptive Fevers .. .. .         | 5         | 1     | 1·1                                | ·21   | 2·6       | ·06   |
| Continued „ .. .. .             | 526       | 6     | 112·3                              | 1·28  | 68·8      | 1·22  |
| Paroxysmal „ .. .. .            | 81        | 3     | 17·2                               | ·64   | 13·0      | ·10   |
| Influenza .. .. .               | 3         | ..    | ·6                                 | ..    | 1·9       | ..    |
| Erysipelas .. .. .              | 12        | ..    | 2·6                                | ..    | 1·9       | ..    |
| Other diseases .. .. .          | 9         | ..    | 1·9                                | ..    | ·7        | ·06   |
| Total of Febrile Group..        | 636       | 10    | 135·7                              | 2·13  | 88·9      | 1·44  |
| <i>Constitutional—</i>          |           |       |                                    |       |           |       |
| Rheumatism .. .. .              | 306       | 1     | 65·2                               | ·21   | 42·9      | ·03   |
| Syphilis .. .. .                | 252       | ..    | 53·7                               | ..    | 51·3      | ·03   |
| Scrofula, Phthisis, &c. .. ..   | 31        | 9     | 6·6                                | 1·92  | 8·1       | 1·25  |
| Scurvy and Purpura .. .. .      | ..        | ..    | ..                                 | ..    | ·2        | ..    |
| Anæmia .. .. .                  | ..        | ..    | ..                                 | ..    | 1·8       | ..    |
| Other diseases .. .. .          | 1         | ..    | ·2                                 | ..    | ·7        | ·10   |
| Total of Constitutional Group.. | 590       | 10    | 125·7                              | 2·13  | 105·0     | 1·41  |

*Eruptive Fevers.*—The admissions (5) were all for scarlet fever. In the beginning of the year 26 men suffering from scarlet fever were admitted into the Station Hospital from one of H.M.'s ships, immediately after this the first admission for the disease among the military occurred, but there was no evidence of a connection between the cases in the garrison and those received from the "Sultan." One attack of scarlet fever proved fatal from intercurrent pneumonia, and it is stated that another death—recorded as from nephritis—might perhaps have been a remote consequence of scarlet fever.

*Continued Fevers.*—The rate of prevalence of fevers of this nature is nearly 22 per 1,000 men higher than the corresponding rate for 1875; the rate of mortality is exactly the same for both years.

*Enteric Fever.*—The 35 admissions for this disease were those of men of eight of the corps in the garrison, and they were received from twelve different barracks. The 31st Regiment returns no admissions for this disease, and the North Front is not mentioned among the localities where the disease appeared. The influence of season in favouring the occurrence of this fever was not shown in a marked way.

*Simple Continued Fever, and Febricula.*—For the first-named disease there were 61, for the last-named 430 admissions.

*Paroxysmal Fevers.*—The rate of admissions is little more than half as high as that for the preceding year. *Ague.*—The 14 admissions for this fever were those of men from seven different corps. *Remittent Fever*, caused 67 admissions, 3 of the illnesses were fatal; the post-mortem appearances in one of the fatal cases are not to be distinguished from those usually found in fatal cases of enteric fever, and in another fatal case death was preceded by peritonitis. Respecting paroxysmal fevers, the Medical Officer of the Station Hospital

*Gibraltar.* writes: "The (recorded) admissions for enteric fever, ague, and remittent fever do not, I think, adequately represent the occurrence of those diseases, as . . . most of the fevers on the Rock (excepting mild cases of simple continued fever and febricula resulting from errors of diet, abuse of stimulants, or exposure to the sun) are of a typho-malarial nature. . . ."  
*Erysipelas.*—The rate of prevalence of this disease is a little lower than that for 1875.

*Rheumatism.*—The rate of prevalence is 9·5 per 1,000 men higher than in the preceding year; in the fatal case death was due proximately to an inter-current cardiac complication.

*Syphilis.*—The rate of admissions exceeds that of the preceding year by 5·6 per 1,000 men.

*Scrofula, Phthisis, &c.*—The rate of admissions differs only fractionally from that of 1875, but the death-rate is larger.

**LOCAL DISEASES.**—*Diseases of the Nervous System.*—Twelve of the 21 admissions for diseases in this order were on account of neuralgia, 1 was for sun-stroke, 4 were for epilepsy.

*Diseases of the Eye.*—49 of the admissions in this order were due to conjunctivitis, a disease more prevalent in the 69th, 102nd, and in the 2nd Batt. 23rd, than in the other corps.

*Diseases of the Circulatory System.*—The diseases in this order are in a lower rate of prevalence, but in a higher rate of mortality than in the preceding year, more than half of the admissions were due to palpitation, 7 of the deaths were from aneurism.

*Diseases of the Respiratory System.*—The rate of admissions is 5·1 per 1,000 men lower than in the preceding year; the rate of deaths is three-fold higher.

*Diseases of the Digestive System.*—The rate of prevalence of diseases in this order is nearly the same as in the preceding year, one-third of the whole admissions was due to tonsillitis; dyspepsia caused 98 admissions, dysentery 3, hepatitis 9, and diarrhoea 1; for colic the relatively large number of 39 admissions took place.

*Diseases of the Urinary System.*—The rate of admissions is fractionally lower than in 1875.

**CONDITIONS, &c.**—The rate of admissions for debility, is two-thirds higher than in the preceding year, the relative prevalence of this condition was greatest in the Royal Artillery, and in the 2nd Battalion of the Rifle Brigade; in the last named corps it is stated that the admissions were usually due to weakness following ague.

**POISONS.**—The rate of admissions is nearly seven times higher than in the preceding year, a circumstance which may perhaps depend rather on difference of diagnosis than on difference in the amount of disease due to drink in the two years.

**INJURIES.**—*Accidental.*—The rate of admissions is 13·4 per 1,000 men, and that of deaths is 43 per 1,000 higher than in 1875; the fatal injuries were caused in one instance by the impaction of a piece of meat in the larynx, in another by fracture of the skull, and in the third by rupture of the liver and spleen.

*Self-inflicted Injuries.*—One admission only, being that for a gunshot wound, is returned in this order.

#### *Officers.*

In an average annual strength of 156 officers there were 131 attacks of illness and 3 deaths, being in the rates of 839·7, and of 19·23 per 1,000 of the strength respectively; each is higher than the corresponding rate of 1875. Eleven officers were invalided during the year, being in the rate of 70·52 per 1,000, which differs only fractionally from that of last year. Of the deaths, 1 was due to enteric fever, 1 to aneurism, and 1 to Bright's Disease.

#### *Women.*

The average annual strength of the wives of the non-commissioned officers and men was 426, amongst whom 150 attacks of illness and 3 deaths are



returned, being in the rates of 352·1, and of 7·04 per 1,000 of the strength *Gibraltar*. respectively. Of the illnesses 7 were due to scarlet fever, 1 to enteric fever, and 31 to fevers of other kinds; 23 illnesses are recorded as due to general debility. Two of the deaths were from phthisis, and one from valve disease of the heart.

#### *Children.*

In an average annual strength of 864 children of non-commissioned officers and men, there were 259 attacks of illness and 34 deaths, being in the rates of 299·8 and of 39·35 per 1,000 of the strength respectively. The death-rate exceeds that of the preceding year by 5·84 per 1,000 of the strength. Eruptive fevers caused 53 attacks of illness, of which 48 were of scarlet fever; there were 42 attacks of other kinds of fevers, 1 being of enteric fever. The proportional prevalence of no order of disease is in excess of that which may be considered as normal for children. Diseases of the *nervous system* (adding the condition of teething to this order) contributed only 12 attacks; diseases of the *respiratory system* 58, diseases of the *digestive system* 44, of which 39 were for diarrhoea. The illnesses returned under the head of general debility were 3 in number. Of the deaths 8 were due to scarlet fever, 1 to cerebro-spinal fever, 2 to scrofula, 1 to tabes mesenterica, 1 to atrophy, 1 to convulsions, 1 to laryngitis, 3 to bronchitis, 3 to pneumonia, 3 to teething, 1 to dysentery, and 9 to diarrhoea.

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#### SANITARY REPORT.

Surgeon-General Huntly G. Gordon reports that the general health of the troops has been good, and that there have been no special causes of diseases.

Surgeon-General Gordon adds, that a report has been rendered for the information of H.E. the General Commanding, embodying all recommendations made by him at his annual inspection of barracks and hospitals for 1876. The most important of these were—the extension of ablution and bath rooms; the substitution of wooden for stone floorings for quarters specified; the provision of fireplaces in certain specified rooms; together with remarks as to the possible source of contamination of water supply from North Front, and a recommendation for the removal of the cess-pit latrines at the Officers' Quarters, Defensible Barracks, Windmill Hill. A number of sanitary services, of a minor character have been carried out, such as the ventilation of sewers, the remedying of defects in soil pipes, the laying on of water to the barracks at North Front, and the improvement of ventilation of barrack rooms, &c., by extraction shafts.

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## II.—MALTA.

#### STATISTICAL REPORT

Exclusive of the Royal Malta Fencible Artillery, the average annual *Malta*. strength of the non-commissioned officers and men serving in the Command was 4,539; the admissions into hospital among them were 3,644; the deaths, including those of 7 invalids, were 47; the average number of daily sick was 198·94. The admissions are therefore in the rate of 802·8, the deaths in that of 10·35, and the daily sick in that of 43·83 per 1,000 of the strength respectively. The rate of admissions is 103·3 per 1,000 men lower than that of the preceding year; the death-rate is fractionally lower; the constantly sick-rate however, is 1·62 per 1,000 higher.

Certain of the most important of the health statistics of the corps which served in the Command in 1876 are shown in the following Table:—

Malta.

| Corps.                        | Completed year of service in the Command. | Average Annual Strength. | Admitted into Hospital. | Died.     |              |        | Invalids sent Home. | Average Daily Sick. | Rate per 1,000 of Strength. |       |            |             | Average Sick-time to each Soldier. | Average duration of cases of Sickness. |
|-------------------------------|-------------------------------------------|--------------------------|-------------------------|-----------|--------------|--------|---------------------|---------------------|-----------------------------|-------|------------|-------------|------------------------------------|----------------------------------------|
|                               |                                           |                          |                         | At Malta. | Of Invalids. | Total. |                     |                     | Admitted.                   | Died. | Invalided. | Daily Sick. |                                    |                                        |
| 12th Brigade, Royal Artillery | 3                                         | 957                      | 782                     | 13        | 3            | 16     | 32                  | 46·17               | 822·3                       | 16·72 | 33·40      | 48·24       | Days.<br>17·61                     | Days.<br>21·55                         |
| Royal Engineers ..            | ..                                        | 206                      | 164                     | 1         | 1            | 2      | 5                   | 7·59                | 791·2                       | 9·71  | 24·27      | 36·84       | 13·44                              | 16·88                                  |
| 27th Foot* ..                 | ..                                        | 57                       | 104                     | 2         | ..           | 2      | ..                  | 3·42                | 1824·6                      | 35·09 | ..         | 60·00       | 21·90                              | 12·00                                  |
| 42nd „ ..                     | 2                                         | 648                      | 367                     | 5         | ..           | 5      | 11                  | 23·42               | 566·4                       | 7·72  | 16·97      | 36·14       | 13·19                              | 23·29                                  |
| 71st „ ..                     | 3                                         | 634                      | 653                     | 2         | 1            | 3      | 12                  | 29·73               | 1030·0                      | 4·73  | 18·91      | 46·89       | 17·12                              | 16·62                                  |
| 74th† „ ..                    | 4                                         | 583                      | 379                     | 2         | 1            | 3      | 9                   | 25·76               | 650·1                       | 5·14  | 15·44      | 44·18       | 16·13                              | 24·81                                  |
| 98th „ ..                     | 1                                         | 731                      | 653                     | 6         | ..           | 6      | 17                  | 30·41               | 893·3                       | 8·21  | 23·25      | 41·60       | 15·18                              | 17·00                                  |
| 101st „ ..                    | 2                                         | 654                      | 505                     | 7         | ..           | 7      | 7                   | 28·43               | 772·2                       | 10·70 | 10·70      | 43·47       | 15·87                              | 20·65                                  |
| Departmental Corps ..         |                                           |                          |                         |           |              |        |                     |                     |                             |       |            |             |                                    |                                        |
| Garrison Staff ..             | ..                                        | 69                       | 37                      | 2         | 1            | 3      | 2                   | 4·01                | 536·5                       | 43·48 | 29·00      | 58·11       | 21·21                              | 39·56                                  |
| Attached Men, &c. ..          |                                           |                          |                         |           |              |        |                     |                     |                             |       |            |             |                                    |                                        |

\* Arrived in the Command from England in November.

† Left the Command in December.

As in the preceding year, the health of the Royal Artillery was worse than that of any corps in the Command having a considerable strength, though its admission-rate is exceeded by the 71st and the 98th Regiments; the high death, invaliding, and constantly sick rates give unfavourable results which in a comparison outweigh the fact that the number of men admitted into hospital was proportionately less than that for each of the regiments noted; half of the deaths in the corps were caused by enteric fever. The highest admission rate is that of the 71st Foot, it exceeds the average of the force in the Command by 227 per 1,000 men; the occurrence of many cases of febricula amongst the men at Pembroke Camp, occasioned this result.

The sickness and mortality in each class and order of diseases, is shown in the following Table:—

| Orders.                    | Diseases.                                 | 1876.—Average Annual Strength,<br>4,539. |           |              |        |                                               |       | 1869-75.                                      |       |
|----------------------------|-------------------------------------------|------------------------------------------|-----------|--------------|--------|-----------------------------------------------|-------|-----------------------------------------------|-------|
|                            |                                           | Admitted into<br>Hospital.               | Deaths.   |              |        | Annual ratio<br>per 1,000 of<br>the Strength. |       | Annual ratio<br>per 1,000 of<br>the Strength. |       |
|                            |                                           |                                          | In Malta. | Of Invalids. | Total. | Admitted.                                     | Died. | Admitted.                                     | Died. |
| I. General Diseases.       |                                           |                                          |           |              |        |                                               |       |                                               |       |
| 1                          | Febrile Group ..                          | 667                                      | 17        | ..           | 17     | 146·9                                         | 3·75  | 181·9                                         | 2·50  |
| 2                          | Constitutional „ ..                       | 463                                      | 1         | 3            | 4      | 102·0                                         | ·88   | 84·0                                          | 1·78  |
| II. Local Diseases.        |                                           |                                          |           |              |        |                                               |       |                                               |       |
| Diseases of the—           |                                           |                                          |           |              |        |                                               |       |                                               |       |
| 1                          | Nervous System ..                         | 66                                       | 3         | ..           | 3      | 14·5                                          | ·66   | 10·5                                          | ·48   |
| 2                          | Eye .. ..                                 | 86                                       | ..        | ..           | ..     | 19·0                                          | ..    | 29·1                                          | ..    |
| 3                          | Ear .. ..                                 | 36                                       | ..        | ..           | ..     | 7·9                                           | ..    | 4·4                                           | ..    |
| 4                          | Nose .. ..                                | 2                                        | ..        | ..           | ..     | ·4                                            | ..    | ·6                                            | ..    |
| 5                          | Circulatory System ..                     | 79                                       | 4         | 3            | 7      | 17·4                                          | 1·54  | 11·4                                          | 1·48  |
| 6                          | Absorbent „ ..                            | 24                                       | ..        | ..           | ..     | 5·3                                           | ..    | 4·9                                           | ..    |
| 7                          | Ductless Glands ..                        | ..                                       | ..        | ..           | ..     | ..                                            | ..    |                                               |       |
| 8                          | Respiratory System ..                     | 176                                      | 4         | 1            | 5      | 38·8                                          | 1·10  | 43·3                                          | ·96   |
| 9                          | Digestive „ ..                            | 684                                      | 5         | ..           | 5      | 150·7                                         | 1·10  | 143·8                                         | ·87   |
| 10                         | Urinary „ ..                              | 194                                      | ..        | ..           | ..     | 42·7                                          | ..    | 40·8                                          | ·15   |
| 11                         | Generative „ ..                           | 58                                       | ..        | ..           | ..     | 12·8                                          | ..    | 12·7                                          | ..    |
| 12                         | Organs of Locomotion..                    | 26                                       | ..        | ..           | ..     | 5·7                                           | ..    | 5·3                                           | ·06   |
| 13                         | Cellular Tissue..                         | 112                                      | ..        | ..           | ..     | 24·7                                          | ..    | 28·3                                          | ·09   |
| 14                         | Cutaneous System ..                       | 297                                      | ..        | ..           | ..     | 65·4                                          | ..    | 64·5                                          | ..    |
| III. Conditions.           |                                           |                                          |           |              |        |                                               |       |                                               |       |
|                            | Debility.. ..                             | 37                                       | ..        | ..           | ..     | 8·2                                           | ..    | 10·5                                          | ..    |
| IV. Poisons ..             |                                           |                                          |           |              |        |                                               |       |                                               |       |
|                            | .. ..                                     | 17                                       | 1         | ..           | 1      | 3·8                                           | ·22   | 11·2                                          | ·27   |
| V. Injuries.               |                                           |                                          |           |              |        |                                               |       |                                               |       |
| 2                          | Accidental .. ..                          | 615                                      | 4         | ..           | 4      | 135·5                                         | ·88   | 100·4                                         | ·63   |
| 3                          | Homicidal .. ..                           | ..                                       | ..        | ..           | ..     | ..                                            | ..    | ·1                                            | ·03   |
| 4                          | Self-inflicted .. ..                      | 4                                        | 1         | ..           | 1      | ·9                                            | ·22   | ·6                                            | ·30   |
| VI. Surgical Operations .. |                                           |                                          |           |              |        |                                               |       |                                               |       |
|                            | .. ..                                     | ..                                       | ..        | ..           | ..     | ..                                            | ..    | ·2                                            | ·06   |
|                            | No appreciable disease..                  | 1                                        | ..        | ..           | ..     | ·2                                            | ..    | 1·3                                           | ..    |
|                            | Total .. ..                               | 3,644                                    | 40        | 7            | 47     | 802·8                                         | 10·35 | 789·8                                         | 9·66  |
|                            | Average of 10 Years, }<br>1866-75 .. .. } | ..                                       | ..        | ..           | ..     | 818·6                                         | 12·51 | ..                                            | ..    |

*Malta.*

**GENERAL DISEASES.**—The prevalence of diseases in this class is 18·4 per 1,000 men lower than the rate for the preceding year, and in correspondence with this the death rate is ·93 per 1,000 men lower. The decreased prevalence occurs in both groups of the class, but the mortality from diseases of the *febrile group* is in a rate one-third higher, whilst that from diseases of the *constitutional group* is 2·23 per 1,000 men lower than in 1875.

The admissions and deaths from the principal diseases in the class, are shown in the following Table :—

| General Diseases.                     | Admitted. | Died. | Annual ratio per 1,000<br>of Strength. |       |           |       |
|---------------------------------------|-----------|-------|----------------------------------------|-------|-----------|-------|
|                                       |           |       | 1876.                                  |       | 1869-75.  |       |
|                                       |           |       | Admitted.                              | Died. | Admitted. | Died. |
| <i>Febrile—</i>                       |           |       |                                        |       |           |       |
| Eruptive Fevers .. .. .               | 4         | ..    | ·9                                     | ..    | 3·0       | ·36   |
| Continued „ .. .. .                   | 618       | 15    | 136·1                                  | 3·30  | 166·8     | 1·96  |
| Paroxysmal „ .. .. .                  | 29        | 1     | 6·4                                    | ·22   | 7·5       | ·15   |
| Influenza .. .. .                     | 4         | ..    | ·9                                     | ..    | 1·7       | ..    |
| Erysipelas .. .. .                    | 10        | ..    | 2·2                                    | ..    | 2·1       | ..    |
| Other diseases of this group .. . . . | 2         | 1     | ·4                                     | ·22   | ·8        | ·03   |
| Total of Febrile Group.. ..           | 667       | 17    | 146·9                                  | 3·74  | 181·9     | 2·50  |
| <i>Constitutional—</i>                |           |       |                                        |       |           |       |
| Rheumatism .. .. .                    | 267       | ..    | 58·8                                   | ..    | 51·3      | ..    |
| Syphilis .. .. .                      | 154       | ..    | 33·9                                   | ..    | 21·1      | ..    |
| Scrofula, Phthisis, &c. .. .. .       | 35        | 4     | 7·7                                    | ·88   | 9·8       | 1·54  |
| Scurvy and Purpura .. .. .            | ..        | ..    | ..                                     | ..    | ·8        | ·03   |
| Anæmia .. .. .                        | 1         | ..    | ·2                                     | ..    | 1·0       | ..    |
| Other diseases of this group .. .. .  | 6         | ..    | 1·3                                    | ..    | ·5        | ·21   |
| Total of Constitutional Group ..      | 463       | 4     | 101·9                                  | ·88   | 84·0      | 1·78  |

*Eruptive Fevers.*—The admissions were for scarlet fever.

*Continued Fevers.*—For all fevers of this nature together, the rate of prevalence is 4·6 per 1,000 men lower than in the preceding year: the rate of mortality from them is ·96 per 1,000 men higher. *Enteric fever*, caused 49 admissions and 13 deaths; the proportion of mortality to cases treated, is therefore 265·30 per 1,000. The only corps which do not return admissions for enteric fever, are the Royal Engineers, the 27th and the 98th Regiments: the proportional prevalence of the disease in the Royal Artillery (26·1 per 1,000 men) was greater than that for any other, excepting the Army Hospital Corps, for which it is 94·3 per 1,000, but the relatively small strength of the last-named corps precludes a fair comparison in this respect. The Principal Medical Officer states that enteric fever cases were received from every barrack in the Command, with the exception of two or three, the names of which are not given. The disease prevailed nearly throughout the year, admissions from it being returned for every month except April, May, and December, in the other months its intensity did not differ importantly; the deaths were most numerous in June and July. Though the general diffusion of this kind of fever throughout the garrison is the most noticeable feature in connection with its presence during the year, the disproportionate frequency of its occurrence amongst the men of the Royal Artillery, who were placed at night during the hot weather in tents pitched on St. James's Cavalier, has considerable interest, in connexion with a possible cause of the outbreak. The Principal Medical Officer states that St. James's Cavalier is on the highest and most airy ground in Valetta, and that the drainage and water

supply for it were satisfactory, but that the cause of the outbreak in the Royal *Malta*. Artillery quartered there "was at last traced to the very large town sewer ventilators placed in its roof on account of the elevated position. During the summer months the inmates of the barracks under the Cavalier slept on the terreplein, and breathed this sewer atmosphere." No more cases occurred when the men of the Royal Artillery (amongst whom the fever had appeared) were encamped on an adjoining bastion. Of the five attacks of enteric fever in the Army Hospital Corps, three are stated to have occurred in men not employed in immediate connection with the sick.

*Simple Continued Fever.*—The prevalence of this form of fever was nearly in the same proportion as that for the preceding year, the admissions for it in the 42nd Regiment are greatly in excess of those in any other corps. Two attacks of simple continued fever were fatal; in one instance the symptoms noted are similar to those present in enteric fever, namely, loss of appetite, great weakness, fever aggravated at night, and attended with severe frontal headache, flushed face and sleeplessness, morning and evening fluctuations of temperature, frequent attacks of epistaxis, eventually diarrhoea, delirium, stupor, and death.

*Febricula.*—Nearly one-third of the admissions for this form of fever took place in September, and they were no doubt in many instances due to the great heat experienced in that month. The Principal Medical Officer, in an appendix to his report, gives an instructive chart showing the relations existing between the prevalence of disease and certain meteorological phenomena; the highest number of admissions and the greatest heat are found together in September, and the excess is chiefly caused by the great number of admissions for febricula.

*Paroxysmal Fevers.*—Nine admissions for ague are returned, none were due to residence in Malta.

*Remittent Fever.*—Of the 20 admissions, one-half are returned by the 98th. An attack of this fever proved fatal in a man of the regiment; jaundice occurred early in the illness, the highest temperature noted (102·6) was on the seventh day, after this it fell steadily to 97·4 on the tenth day; suppression of urine occurred on the eighth day, and when the secretion reappeared it was very scanty and contained much albumen. On the eleventh day spots of ecchymosis appeared on the skin; death was preceded by repeated attacks of convulsions.

*Erysipelas.*—The rate of admission for this disease is little more than the half of that for 1875.

*Rheumatism.*—The rate of admissions is a little lower than that for the preceding year.

*Syphilis.*—The rate of admissions is 5·1 per 1,000 men lower than in the preceding year.

*Scrofula, Phthisis, &c.*—Both the rate of prevalence, and that of mortality, are materially lower than in 1875, but in dealing with such small numbers as the admissions for these diseases give, great fluctuations are to be expected, and the results for one year have therefore comparatively little importance.

*LOCAL DISEASES.—Diseases of the Nervous System.*—The rate of admissions exceeds that of the preceding year, by more than a third; nearly half of the admissions were for neuralgia, 15 were for epilepsy, and 12 were for various forms of mental disease. One of the deaths was caused by encephalitis, and two by apoplexy.

*Diseases of the Eye.*—There is a greatly diminished rate of prevalence for diseases of this order on that of 1875, the probable cause of which is not adverted to in the reports.

*Diseases of the Circulatory System.*—The rate of admissions is nearly the same as that for the preceding year; of 79 admissions, 54 were for palpitation. Six of the deaths were due to aneurism.

*Diseases of the Respiratory System.*—The rate of admissions is 16·9 per 1,000 lower than that for 1875, and this decrease is accompanied by a lower death-rate.

*Diseases of the Digestive System.*—The rate of admissions is 37·3 per 1,000 men lower than in the preceding year, but a much greater fatality attended

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diseases of this order than in that year; 3 of the deaths were due to hepatitis, 1 to acute atrophy of the liver, and 1 to peritonitis.

*Diseases of the Urinary System.*—The rate of prevalence of diseases in this order is 8·7 per 1,000 men lower than that for the preceding year.

*CONDITIONS, &c.—General Debility.*—The rate of admissions is only the half of that for 1875.

*POISONS.*—The admissions in this class were all due to the effects of drink; the proportional prevalence is fractionally higher than in 1875.

*INJURIES.—Accidental.*—The rate of admissions is 16·8 per 1,000 men higher than that for the preceding year; of the deaths, 1 was caused by drowning, 2 by fracture of the skull, and 1 by injury of the spine, from a fall in the gymnasium.

*Officers.*

In an average annual strength of 217 officers, there were 130 attacks of illness, and 3 deaths; 9 officers were invalided to England. The proportions given by these numbers are, for attacks of illness, 599; for deaths, 13·82; and for invaliding, 41·48 per 1,000 of the average annual strength, respectively.

Fever caused more illnesses than any other single disease. The deaths were due to apoplexy (2), to hepatitis terminating in abscess (1). Of the invaliding, hepatitis was the cause in three instances, in one of them the disease had ended in abscess. The prevalence of inflammation of the liver, and that of a very dangerous kind, amongst officers in the present year, is in consonance with the same circumstance observed amongst the men.

*Women.*

In an average annual strength of 429 wives of non-commissioned officers and men, there were 201 attacks of illness recorded, and 4 deaths, being in the annual rates of 468·5, and of 9·32 per 1,000 of the strength respectively.

Diseases of the *febrile group*, caused 30 of the attacks, enteric fever in one instance; conjunctivitis was relatively frequent; diarrhoea caused 20 attacks. The deaths were due to enteric fever, 1; choleraic diarrhoea, 1; apoplexy, 1; aneurism of aorta, 1.

*Children.*

In an average annual strength of 834 children of non-commissioned officers and men, there were 531 attacks of illness and 41 deaths, being in the annual rates of 634·3, and of 49·16 per 1,000 of the strength, respectively. The death rate is 4·24 per 1,000 lower than that of the preceding year. Eruptive fevers caused 13 attacks, of which 8 were of diphtheria; enteric fever caused 3, and fevers of other kinds, 57 attacks; whooping-cough, 2 attacks; phthisis was comparatively infrequent, only 3 attacks are recorded, but they probably represent only the severest forms of the disease met with; conjunctivitis caused 50 attacks; bronchitis, 80; dysentery, 3; diarrhoea, 83; tænia solium, 10. The illnesses returned under the head of general debility were 24, taken in connection with the mortality attending them, and the known presence of enteric fever in the garrison, it may be suspected that some of the fatal cases of the condition referred to, may really have been illnesses from enteric fever.

## ROYAL MALTA FENCIBLE ARTILLERY.

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The average annual strength of the non-commissioned officers and men of this corps was 339, amongst whom there were 258 admissions into hospital, being in the rate of 761·1 per 1,000 of the strength. No death took place during the year. The number constantly sick was 11·53, being in the rate of 34·01 per 1,000 of the strength. The admission rate is 13·6 lower, and that of constantly sick is 4·20 higher than the corresponding rate of 1875.

The admissions, in the different classes and orders of diseases, are shown in the following Table :—

| Orders. | Average Strength .. ..              | Royal Malta Fencible Artillery. |           |                                     |           |              |             | English Troops at Malta in 1876.    |              |
|---------|-------------------------------------|---------------------------------|-----------|-------------------------------------|-----------|--------------|-------------|-------------------------------------|--------------|
|         |                                     | 339                             |           | Annual Ratio per 1,000 of Strength. |           |              |             | Annual Ratio per 1,000 of Strength. |              |
|         |                                     |                                 |           | 1876.                               |           | 1869-75.     |             |                                     |              |
|         |                                     | Admitted.                       | Died.     | Admitted.                           | Died.     | Admitted.    | Died.       | Admitted.                           | Died.        |
|         | Diseases.                           |                                 |           |                                     |           |              |             |                                     |              |
|         | <b>I. General Diseases.</b>         |                                 |           |                                     |           |              |             |                                     |              |
| 1       | Febrile Group .. ..                 | 23                              | ..        | 67·9                                | ..        | 60·6         | 1·49        | 146·9                               | 3·75         |
| 2       | Constitutional „ ..                 | 49                              | ..        | 144·9                               | ..        | 83·0         | ·90         | 102·0                               | ·88          |
|         | <b>II. Local Diseases.</b>          |                                 |           |                                     |           |              |             |                                     |              |
|         | <b>Diseases of the—</b>             |                                 |           |                                     |           |              |             |                                     |              |
| 1       | Nervous System .. ..                | 1                               | ..        | 2·9                                 | ..        | 11·3         | ·90         | 14·5                                | ·66          |
| 2       | Eye .. ..                           | 25                              | ..        | 73·7                                | ..        | 128·1        | ..          | 19·0                                | ..           |
| 3       | Ear .. ..                           | 1                               | ..        | 2·9                                 | ..        | 2·7          | ..          | 7·9                                 | ..           |
| 4       | Nose .. ..                          | ..                              | ..        | ..                                  | ..        | ·6           | ..          | ·4                                  | ..           |
| 5       | Circulatory System ..               | 7                               | ..        | 20·6                                | ..        | 5·1          | ·59         | 17·4                                | 1·54         |
| 6       | Absorbent „ ..                      | 2                               | ..        | 5·9                                 | ..        | 5·3          | ..          | 5·3                                 | ..           |
| 8       | Respiratory System ..               | 11                              | ..        | 32·4                                | ..        | 55·5         | ..          | 38·8                                | 1·10         |
| 9       | Digestive „ ..                      | 31                              | ..        | 91·4                                | ..        | 164·8        | 1·49        | 150·7                               | 1·10         |
| 10      | Urinary „ ..                        | 23                              | ..        | 67·9                                | ..        | 59·4         | ..          | 42·7                                | ..           |
| 11      | Generative „ ..                     | 4                               | ..        | 11·8                                | ..        | 9·0          | ·30         | 12·8                                | ..           |
| 12      | Organs of Locomotion                | 1                               | ..        | 2·9                                 | ..        | 2·7          | ..          | 5·7                                 | ..           |
| 13      | Cellular Tissue .. ..               | 7                               | ..        | 20·6                                | ..        | 34·9         | ..          | 24·7                                | ..           |
| 14      | Cutaneous System ..                 | 40                              | ..        | 118·0                               | ..        | 105·7        | ..          | 65·4                                | ..           |
|         | <b>III. Conditions.</b>             |                                 |           |                                     |           |              |             |                                     |              |
|         | Debility .. ..                      | 1                               | ..        | 2·9                                 | ..        | 1·8          | ..          | 8·2                                 | ..           |
|         | <b>IV. Poisons</b>                  | ..                              | ..        | ..                                  | ..        | ·9           | ..          | 3·8                                 | ·22          |
|         | <b>V. Injuries.</b>                 |                                 |           |                                     |           |              |             |                                     |              |
| 2       | Accidental .. ..                    | 32                              | ..        | 94·4                                | ..        | 53·1         | ..          | 135·5                               | ·88          |
| 3       | Homicidal .. ..                     | ..                              | ..        | ..                                  | ..        | ·6           | ·30         | ..                                  | ..           |
| 4       | Self-inflicted .. ..                | ..                              | ..        | ..                                  | ..        | ·3           | ..          | ·9                                  | ·22          |
|         | No appreciable disease              | ..                              | ..        | ..                                  | ..        | ·6           | ..          | ·2                                  | ..           |
|         | <b>Total .. ..</b>                  | <b>258</b>                      | <b>..</b> | <b>761·1</b>                        | <b>..</b> | <b>786·0</b> | <b>5·97</b> | <b>802·8</b>                        | <b>10·35</b> |
|         | <b>Average of 10 years, 1866-75</b> | <b>..</b>                       | <b>..</b> | <b>..</b>                           | <b>..</b> | <b>774·9</b> | <b>7·01</b> | <b>..</b>                           | <b>..</b>    |

**GENERAL DISEASES.**—The rate of prevalence of diseases in this class exceeds that of the preceding year, by 51·9 per 1,000 men; nearly the whole of the increase is in diseases of the *constitutional group*.

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*Febrile Group.*—There was no admission for any eruptive fever. *Continued Fevers.*—Of the 21 admissions, 1 was for enteric fever, and 20 were due to febricula; respecting them, the medical officer of the regiment states that the enteric fever case of illness was contracted in the military prison; and concerning the admissions for febricula, he writes: "The cases of febricula occurred as frequently as formerly: some were dependent on exposure to cold, and lasted only a few days, whilst others were caused by some climatic influence, not malarial, had a long course, and were followed by rheumatic or neuralgic pains, orchitis, and anæmia. These last long-continued cases would have been called by foreigners, 'Malta Fever,' but I am convinced that there is no such thing as a class of fevers endemic in this island . . . ." *Paroxysmal Fevers.*—The 2 admissions for ague were those of men who had contracted the disease elsewhere.

*Constitutional Group.*—The rate of admissions for rheumatism is 79·6, and that for syphilis is 69 per 1,000 men.

*Diseases of the Eye.*—The rate of admissions shows a decrease of 59 per 1,000 on that of the preceding year, and the medical officer states that the cases have also been of less severity; he attributes both results to a systematic inspection of the men suffering from granular eyelids, and to the use of tannic acid, in glycerine, in the treatment of even the mildest chronic cases of this affection.

Diseases of the *Circulatory System*, are in a little higher rate than that of 1875; the rates of diseases of the *Respiratory, and Digestive Systems*, are a little lower; in the latter order there are 13 admissions for dyspepsia, all of which it is stated were due to errors in diet, not to drunkenness. *Diseases of the Urinary System*, are 3 per 1,000 men in excess of the very high rate of the preceding year. The remarks of the medical officer respecting diseases of this order, are important:—"The admissions for gonorrhœa seem rather too many, but about one-third have been for relapses as, in order to be exempt from stoppages, the men do their best to deceive the medical officer by hiding the discharge; in a few days they come back to hospital, and the number of admissions is accordingly increased."

*INJURIES.*—*Accidental.*—Nearly a third of the admissions in this class were for blisters of the feet, occurring in recruits, who, previously to enlistment, had worn sandals, or had walked barefooted.

*Invaliding.*

Two men, being in the rate of 6 per 1,000 of the strength, were invalided, one for mental disease, and one for valve disease of the heart.

*Constantly Sick.*

The average number constantly sick, 11·53, is in the rate of 34·01 per 1,000 men, and from this number it is found that the sick time to each soldier during the year was 12·41 days, and that the average duration of each case of sickness was 16·31 days.

## SANITARY REPORT.

Surgeon-General Fraser, C.B., remarks that no substantial change has taken place in the condition of the barracks in the Command since his last Report.

"No alteration has been effected in the generally defective condition of the drainage of Malta; but now that the Imperial Government has notified its consent to contribute towards the total expense, it is to be hoped that its general improvement will be carried out. That portion of the scheme which the Commanding Royal Engineer has had in hand, on the Cottonera side, since the end of 1875, is progressing as fast as possible, and he calculates it will be completed in March, 1878. Should the Civil Government vote the money necessary for remodelling the street sewers in the 'Three Cities,' and connect them with the intercepting sewers now in progress, this part of the scheme may also be completed in March, 1878.



"The general condition of the barracks is as good as the faulty casemated *Malta* construction of many of them will allow.

"The subject of fuel for the winter months in barracks has been under consideration, as it is at present only allowed in guard-rooms.

"The dilapidated wooden (Crimean) huts in the advanced works at Floriana are, I understand, to be removed.

"*Space of Men in Barracks.*—No increase has taken place in the cubic or superficial space during the year. The same general surface crowding, therefore, continues, and to relieve this, about half the men sleep in tents during the summer months, to reduce the number in the barrack dormitories.

"The lower tier of casemates in Lower St. Elmo barracks has been improved as far as practicable, and some of the rooms recommended for occupation, excepting during the hot summer months.

"The old military prison has also been converted into 12 married quarters and will be shortly occupied.

"The *ventilation* in some of the barracks is good, in others fair, and all are provided with inlets and outlets. Most of them are lighted with gas.

"The *drainage* of the barracks is satisfactory, excepting as to their outlets into the harbours, which will not be rectified until the general drainage improvements are carried out. The water latrines and urinals in all are in good condition and regularly flushed with water, either fresh or salt. The 'Camerata' married quarters, with upwards of 100 waterclosets, is in a most unsatisfactory state, and is now being thoroughly examined by the Royal Engineer Department, with a view to its general improvement as respects drainage, new water latrines, and water supply. The tank water having been contaminated, aqueduct water was laid on for drinking and cooking purposes. The building has accordingly been evacuated for the above purpose.

"Some of the town sewer ventilators, which have their outlets on the roof of St. James's Cavalier, from its being the highest ground in Valletta, have been raised considerably in consequence of several cases of enteric fever having occurred amongst its inmates, who slept in the terreplein during the summer months; it subsided on the men being placed in tents on the parade ground below.

"The main sewers at Pembroke Barrack, Cottonera Hospital, and Notre Dame, and also at the Officers' Pavilion, Floriana, have been ventilated.

"Some of the barracks are supplied with aqueduct water, which is very good, and others with tank water or both. The supply is sufficient, but limited.

"The Commanding Royal Engineer has proposed, and I believe submitted, to the War Office, an improved system of filtering, which, if approved of, will be applied gradually to all the tanks.

"The ablution and bath accommodation is satisfactory, with sufficient water laid on. At Pembroke Barrack salt water is laid on, and fresh water is carried by hand.

"A new ablution room and baths have been provided in the Lascaris Barracks for the Royal Malta Fencible Artillery.

"The cook-houses are all in good condition, and provided with Warren's and Deans' cooking range.

"The military prison may now be considered to be in a good sanitary condition, since the dry-earth conservancy system has been carried out in its integrity.

"There has been no admission from enteric fever since March last. The prison dietary, however, is under consideration, and an increase of the meat diet has been recommended.

"No material change has been effected in the hospitals during the year.

"The supply of Cottonera Hospital with aqueduct water has been under consideration; but the limited quantity from the 'Fanara' aqueduct is likely to prevent this being carried out.

"Valletta Station Hospital should be converted into a barrack, and a new hospital erected, as recommended by the Royal Sanitary Commission in 1863. A female hospital is also very much wanted for the treatment of serious cases of diseases occurring among the wives and children of soldiers. Separate and detached wards for the treatment of infectious diseases are also wanted,

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and I have recommended that the barrack store in rear of Cottonera Hospital be converted into an infectious hospital, if a new one cannot be provided.

"A comparative table of *diseases* during the last five years shows a considerable reduction in the ratio of admissions during 1876, but an increase in the mortality, caused by the greater prevalence of enteric fever. The ratio of invaliding has been considerably less than last year."

[The following report on the alleged origin of four cases of enteric fever, among the men of Army Hospital Corps at Cottonera Hospital, in connection with the use of tank water, was drawn up by Surgeon-Major Adcock, under whose medical charge the cases occurred, in compliance with a request to that effect.]

*"Cottonera Hospital, 10th November, 1876.*

"The men of the Army Hospital Corps stationed at this hospital, who were attacked with typhoid fever, were those named in the accompanying return, and employed as therein stated. Sergeant W. and Private S. were ill for some time before their admission; but from the nature of their duties they were able to keep about longer than the other two men. In fact, the four men were attacked about the same time.

"At this period I am informed that the hospital steward, the corporal cook and the gas and water orderlies, were all suffering from feverish symptoms, all of whom lived on the ground-floor, and, together with the four men who suffered from enteric fever, drank water from the same source, namely, the tap attached to the force pump, which brought water from the filtering chamber of tank 47 B. The only man living on the ground-floor who did not suffer was the compounder of medicines, who states that he drank the same water, but only after it had been passed through the filter in the dispensary. The tap alluded to was the favourite source for the drinking water used by the residents on the ground-floor, owing to its coolness, coming, as it did, direct from the underground tank; whereas the water from the taps of the water service of the hospital, coming from the iron tank on the roof, was warm and flat in taste.

"No case of fever occurred amongst the orderlies doing duty in the wards and living in the upper part of the building; neither was any patient attacked.

"These persons drank water from the water service of the hospital, supplied from another tank. Moreover, the water was drunk always after being passed through the filters, of which there are two in each ward.

"The condition of tank 47 B was found to be as follows:—

"The tank is a very large one, cut out of the rock and covered with an arched roof of masonry. It is situated immediately in rear of the hospital at the south side of the kitchen and offices. On examining it, with a view to discover any possible source of sewage contamination, a small square opening was found, partly closed with a stone plug, and leading into a small catch-pit, situated under one corner of the flagged space surrounding the opening of the tank.

"The flagged space—about 10 feet square, with a raised margin—was intended to catch any water which might be spilt when drawing water by buckets. The spilt water was then supposed to run into the catch-pit, and thence be carried by an earthenware pipe drain into the sewers. After a short course this pipe drain passed under the tap of the force pump, where a bell-trap was placed.

"Still further in its course, it received the drain water from the cook-house and thence passed to the main drain. On removing the plug, the catch-pit was found to be filled with black offensive mud, as was also the pipe drain. On further investigation it was found that water poured into the bell-trap under the force pump, ran at once into the catch-pit. This had actually occurred, I am informed, before I was in charge, to such an extent as to flood the flagged space with dirty water. It thus appears that water from a foul drain was constantly flowing into the catch-pit, and there depositing the more solid parts of the sewage.

"On representations being made to the R.E. authorities, they closed the catch-pit and removed the foul drain altogether. They also pumped out the water from the tank, as it had, on analysis, been found to be impure and unfit for drinking. *Malla.*

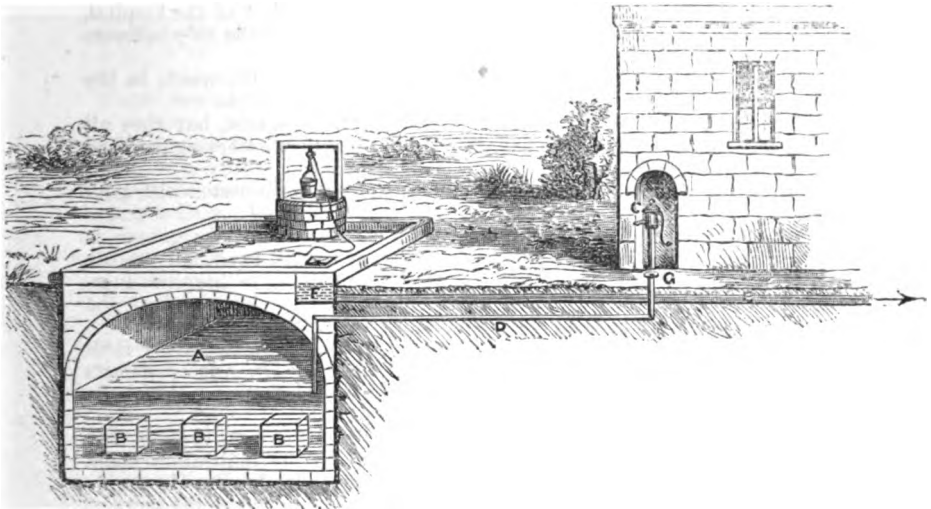
"On the water being pumped out from the tank, I descended into the filtering chamber to see if any leakage had occurred into the tank, and discovered water dripping into the filtering chamber through a large opening in the roof, by which the suction-pipe of the force pump entered.

"The opening being unfortunately immediately under the site of the catch-pit and foul drain, the iron suction pipe was coated with slimy matter and rust, and water had evidently for a long time been constantly trickling down it into the filtering chamber.

"I am quite convinced, by my investigations, that, owing to the faulty construction of the foul drain, sewage had for some time gravitated into the catch-pit, depositing there the more solid parts, the fluid portion gradually finding its way into the filtering chamber, through the hole in the roof of the tank, by which the suction-pipe entered. Though the bell-trap under this force pump was not intended for such a purpose, I believe that slops were constantly thrown there by the married people living in the hospital.

"In conclusion I beg to remark that at once, on the discovery of the state of the tank, the use of the water was discontinued, after which no fresh cases of enteric fever occurred amongst the residents of the hospital."

TANK 47B—COTTONERA HOSPITAL.



A.—Filtering chamber of Tank 47B.  
B.—Filtering stones.  
C.—Force pump.  
D.—Suction pipe.

E.—Foul drain.  
F.—Catch-pit.  
G.—Trap.

*"Station Hospital, Cottonera, 10th November, 1876.*

*Malta.*

*"Cases of Enteric Fever from Detachment Army Hospital Corps serving at the above Hospital.*

| Regimental No. | Rank and Names.  | Age. |       |     | Service. | Single or Married. | Room in Hospital from which admitted.                                 | Date of Admission.        | Results.                 | Remarks.                                  |
|----------------|------------------|------|-------|-----|----------|--------------------|-----------------------------------------------------------------------|---------------------------|--------------------------|-------------------------------------------|
|                |                  | Yrs. | Mths. |     |          |                    |                                                                       |                           |                          |                                           |
| 2716           | Private E. H.... | 21   | 3     | ... | S.       | {                  | No. 42, Nurses' Room, }<br>to Prisoners' Ward }<br>Ground Floor ... } | 1876.<br>27 August...     | Cured                    | { Orderly to }<br>Prisoners' }<br>Ward. } |
| 2527           | " R. A. ...      | 21   | 2     | ... | S.       | {                  | No. 16, Store Orderlies' }<br>Room, G Floor ... }                     | 27 August...              | Died                     | { Assistant }<br>Cook. }                  |
| 2580           | " W. S. ...      | 21   | 2     | ... | S.       | {                  | No. 16, Store Orderlies' }<br>Room, G Floor ... }                     | 16 Septem- }<br>ber ... } | Cured                    | { Provision }<br>Store Or- }<br>derly. }  |
| 144            | Sergt. F. W. ... | 40   | 20    | 9   | M.       | {                  | Hospital Sergeant, }<br>No. 1, Ground Floor }                         | 1 October ...             | Under treat- }<br>ment } | { Ward- }<br>master. "                    |

Surgeon-General J. Fraser, C.B., in a covering letter to the foregoing, reports:—

"On the alleged causes being brought to my notice, I satisfied myself as far as possible, by personal observation and inquiry, as to the defects referred to. I concur in the report for the following reasons:—

"1st. Army Hospital Corps men, living on the ground floor of the hospital, who alone drink of the water pumped from tank 47 B, were the only sufferers from enteric fever.

"2nd. No cases occurred among the patients occupying the wards in the upper storeys, who drank water pumped from another tank 47 A.

"3rd. Some cases of enteric fever were treated in wards, but they all originated in barracks, and were not attended by these men, excepting the ward master; orderlies attending cases in wards did not suffer.

"4th. No fresh cases occurred after closing the pump connected with tank 47 B.

"5th. The excess of organic matter, whatever its source may have been, is not very large, but no other assignable cause can be alleged to account for the fever being confined to men of Army Hospital Corps living in hospital, inasmuch as this tank 47 B receives water only from the clean roof of the hospital and kitchen, and from a reserve tank now dry.

"6th. The excess of organic matter appears to have been caused by infiltration from the foul drain and catch-pit, as described by Dr. Adcock, defects duly brought to the notice of the Commanding Royal Engineer, which he caused at once to be remedied and the tank cleaned out.

"7th. It is, however, due to the Commanding Royal Engineer to state, that he is, notwithstanding, very decidedly of opinion that no infiltration could possibly have taken place, for reasons which he gives in detail. He simply admits the filtration of some surface water at the opening, where the suction-pipes enter through the ground at this corner, after heavy rains; but thinks that it would not contain any quantity of injurious matter, if any at all.

"Having recommended the laying on of aqueduct water to Cottonera Hospital, I am happy to be able to state that the Commanding Royal Engineer is in communication with the Civil Government with a view to obtaining a supply from Fanora aqueduct, before going into estimates for the necessary works.

"There are practical engineering difficulties, and considerable expense will be incurred in carrying this out."

Analysis of Water from Hospital Tank 47 B, 13th September, 1876.  
Cottonera, Malta.

*Malta.*

| Composition.                        | Grains per Gallon.                                          |                     | Excess. | Remarks.                                                                                                                                      |
|-------------------------------------|-------------------------------------------------------------|---------------------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------|
|                                     | Good Water should not exceed the undermentioned quantities. | Result of Analysis. |         |                                                                                                                                               |
| Oxidizable Organic Matter ..        | 1.5                                                         | 3.066               | 1.566   | There appears to be an excessive amount of organic matter, and on this account alone the water ought to be objected to for drinking purposes. |
| Oxygen to oxidize Organic Matter .. | ..                                                          | .1925               | ..      |                                                                                                                                               |
| Ammonia .. .. .                     | ..                                                          | Trace.              | ..      |                                                                                                                                               |
| Chlorine (Chloride of Sodium) ..    | ..                                                          | 1.438               | ..      |                                                                                                                                               |
| Lime .. .. .                        | ..                                                          | 2.372               | ..      |                                                                                                                                               |
| Total hardness .. .. .              | ..                                                          | 9.800               | ..      |                                                                                                                                               |
| Permanent do. .. .. .               | ..                                                          | 4.000               | ..      |                                                                                                                                               |
| Removables .. .. .                  | ..                                                          | 5.800               | ..      |                                                                                                                                               |

Physical character: taste indifferent; slightly opaque; reaction, nil; sediment inappreciable.

## Section II.

### *On the extent of Invaliding among the Troops serving in the Mediterranean.*

There were 39 non-commissioned officers and men invalided from Gibraltar, and 95 from Malta, being in the rates of 8.31 for the former, and of 20.93 per 1,000 of the strength from the latter Command. Twenty-six men, invalids, from Gibraltar, being in the rate of 5.54 per 1,000, were finally discharged the service during the year. From Malta 58 invalids, being in the rate of 12.80 per 1,000 of the strength, were finally discharged.

*Mediterranean*

| Orders. | Diseases.                            | Invalids sent home from |        |        | Invalids discharged at Netley, &c., from |        |        |
|---------|--------------------------------------|-------------------------|--------|--------|------------------------------------------|--------|--------|
|         |                                      | Gibraltar.              | Malta. | Total. | Gibraltar.                               | Malta. | Total. |
|         | I. <i>General Diseases.</i>          |                         |        |        |                                          |        |        |
| 1       | Febrile Group .. ..                  | 1                       | 1      | 2      | ..                                       | ..     | ..     |
| 2       | Constitutional „ .. ..               | 16                      | 27     | 43     | 10                                       | 23     | 33     |
|         | II. <i>Local Diseases.</i>           |                         |        |        |                                          |        |        |
|         | Diseases of the—                     |                         |        |        |                                          |        |        |
| 1       | Nervous System .. ..                 | 1                       | 14     | 15     | 2                                        | 5      | 7      |
| 2       | Eye .. ..                            | ..                      | 1      | 1      | 1                                        | 4      | 5      |
| 3       | Ear .. ..                            | ..                      | 4      | 4      | ..                                       | 4      | 4      |
| 5       | Circulatory System .. ..             | ..                      | 18     | 18     | 5                                        | 11     | 16     |
| 7       | Absorbent „ .. ..                    | ..                      | 1      | 1      | ..                                       | ..     | ..     |
| 8       | Respiratory „ .. ..                  | ..                      | 2      | 2      | 1                                        | 2      | 3      |
| 9       | Digestive „ .. ..                    | 2                       | 6      | 8      | ..                                       | 1      | 1      |
| 10      | Urinary „ .. ..                      | 1                       | 3      | 4      | 2                                        | 1      | 3      |
| 11      | Generative „ .. ..                   | ..                      | 2      | 2      | ..                                       | ..     | ..     |
| 12      | Organs of Locomotion .. ..           | 1                       | 2      | 3      | 1                                        | 1      | 2      |
| 13      | Cellular Tissue .. ..                | 1                       | ..     | 1      | ..                                       | 1      | 1      |
| 14      | Cutaneous System .. ..               | ..                      | ..     | ..     | ..                                       | 1      | 1      |
|         | III. <i>Conditions, &amp;c.</i>      |                         |        |        |                                          |        |        |
|         | Debility .. ..                       | 16                      | 9      | 25     | 3                                        | 3      | 6      |
|         | V. <i>Injuries.</i>                  |                         |        |        |                                          |        |        |
|         | Accidental.. ..                      | ..                      | 4      | 4      | ..                                       | 1      | 1      |
|         | Self-inflicted .. ..                 | ..                      | 1      | 1      | ..                                       | ..     | ..     |
|         | VI. <i>Surgical Operations</i> .. .. | ..                      | ..     | ..     | 1                                        | ..     | 1      |
|         | Total .. ..                          | 39                      | 95     | 134    | 26                                       | 58     | 84     |
|         | Ratio per 1,000 of Mean { 1876 ..    | 8·31                    | 20·93  | 14·51  | 5·54                                     | 12·80  | 9·10   |
|         | Strength .. { 1866-75                | 27·30                   | 25·63  | 26·43  | 17·59                                    | 17·29  | 17·43  |

As regards Gibraltar, all the results are more favourable than those of the preceding year.

### Section III.

#### *Mean Daily Sick.*

The average number of non-commissioned officers and men constantly sick in Gibraltar was 175·6, and in Malta 198·94, being in the annual rates of 37·40 and of 43·83 per 1,000 of the strength respectively; the first shows a fractional decrease on the rate of the preceding year, the last a fractional increase.

The usual information calculated from these numbers is given in the following Table :—

|                                                | Gibraltar. | Malta<br>(exclusive of<br>Royal Malta<br>Fencible<br>Artillery). |
|------------------------------------------------|------------|------------------------------------------------------------------|
| Average Strength in 1876 ..                    | 4,695      | 4,539                                                            |
| Average constantly Sick.. ..                   | 175·6      | 198·94                                                           |
| Ratio per 1,000 con-<br>stantly Sick { 1876 .. | 37·40      | 43·83                                                            |
| { 1866-75..                                    | 33·25      | 41·15                                                            |
|                                                | days       | days                                                             |
| Average Sick time to { 1876 ..                 | 13·65      | 16·00                                                            |
| each Soldier { 1866-75..                       | 12·14      | 15·02                                                            |
| Average duration of { 1876 ..                  | 20·48      | 19·93                                                            |
| each case of Sickness { 1866-75..              | 18·56      | 18·35                                                            |

Compared with 1875 all the results are favourable as regards Gibraltar, and unfavourable as regards Malta; but in both instances the differences are inconsiderable.

#### Section IV.

##### *Influence of the Age on Mortality.*

The relation of age (arranged in quinquennial periods) to mortality, in the troops serving in the Mediterranean Commands, is shown in the following Table:—

|                            |                                     | Under<br>20. | 20 and<br>under 25. | 25 and<br>under 30. | 30 and<br>under 35. | 35 and<br>under 40. | 40 and<br>upwards. |
|----------------------------|-------------------------------------|--------------|---------------------|---------------------|---------------------|---------------------|--------------------|
| Mediterranean<br>Commands. | 1876 { Average Strength ..          | 685          | 3,500               | 2,099               | 859                 | 966                 | 198                |
|                            | { Died ..                           | 1            | 24                  | 15                  | 6                   | 15                  | 4                  |
|                            | { Ratio per 1,000 of<br>Strength .. | 1·46         | 6·86                | 7·15                | 6·98                | 15·53               | 20·20              |
|                            | 1866-75 Do. Do. ..                  | 2·72         | 6·23                | 10·09               | 12·32               | 15·99               | 24·82              |

# IV.—ON THE HEALTH OF THE TROOPS SERVING IN THE DOMINION OF CANADA.

## Section I.

### Sickness and Mortality.

#### STATISTICAL REPORT.

#### *Dominion of Canada.*

THE force in this Command was stationed at Halifax; its composition was altered during the year by the replacement of the batteries of Royal Artillery, the companies of Royal Engineers, and of both of the regiments of Infantry, by other corps which had served previously in the Bermuda, and in the West India Commands.

The average annual strength of the troops was 1,760, the admissions into hospital were 1,084, the deaths in the Command, with that of an invalid on the passage home, were 8; the average number of constantly sick was 51·74. The proportions given by these numbers are, for admissions 615·9, for deaths 4·55, and for constantly sick 29·4 per 1,000 of the strength respectively. The rate of admissions is 42·7, that of deaths is 4·35, and that of constantly sick is 1 per 1,000 men lower, than the corresponding rate of 1875.

Certain particulars of the results of sickness in the corps serving in the Command are shown in the following Table:—

| Corps.                            | Annual Average Strength. | Admitted into Hospital. | Died. | Invalided. | Average constantly Sick. | Ratio per 1,000 of Strength. |       |            |                  | Average Sick time to each Man. | Average duration of each case of Sickness. |
|-----------------------------------|--------------------------|-------------------------|-------|------------|--------------------------|------------------------------|-------|------------|------------------|--------------------------------|--------------------------------------------|
|                                   |                          |                         |       |            |                          | Admitted.                    | Died. | Invalided. | Constantly Sick. |                                |                                            |
| * 7th Brigade Royal Artillery ... | 315                      | 177                     | 1     | 6          | 12·53                    | 561·9                        | 3·17  | 19·05      | 39·78            | Days, 14·32                    | Days, 25·81                                |
| † Royal Engineers ...             | 101                      | 68                      | ...   | 4          | 4·33                     | 673·3                        | ...   | 39·60      | 12·87            | 15·65                          | 23·21                                      |
| ‡ 1st Battalion 20th Foot ...     | 54                       | 70                      | 1     | ...        | 2·14                     | 1296·3                       | 18·52 | ...        | 39·63            | 14·47                          | 11·16                                      |
| § 1st Battalion 60th Foot ...     | 609                      | 310                     | 3     | 12         | 12·08                    | 509·0                        | 4·93  | 19·70      | 19·83            | 7·24                           | 14·22                                      |
| 87th Foot ...                     | 618                      | 416                     | 2     | 15         | 20·70                    | 673·1                        | 3·24  | 24·27      | 33·50            | 12·23                          | 18·16                                      |
| ¶ 97th Foot ...                   | 32                       | 33                      | ...   | ...        | ·59                      | 1031·2                       | ...   | ...        | 18·44            | 6·73                           | 6·53                                       |
| Departmental Corps, &c. ...       | 30                       | 10                      | 1     | 1          | ·37                      | ...                          | ...   | ...        | ...              | ...                            | ...                                        |

\* Nos. 1, 2, and 7 Batteries left the Command in February; Nos. 3, 5, and 6 arrived in April.

† No. 7 Company was replaced by No. 26 Company in April.

‡ Arrived in November.

|| Left in December.

§ Left in December.

¶ Arrived in December.

The rate of prevalence of sickness in the 87th Regiment compares unfavourably with that in the 1st Battalion of the 60th, and the same feature has been exhibited for three years in succession. It is stated that the number of old soldiers in the 87th may account for the greater amount of sickness in it, but this explanation is not supported by an examination of the returns of ages furnished by the Commanding Officers of the regiments, these correspond very closely, and it may moreover be assumed that an excess of young soldiers would increase the rate of prevalence of sickness in a regiment, however favourably the rate of mortality may be influenced by such a circumstance.



The admissions and deaths in the different classes and orders of diseases *Dominion of Canada.* are shown in the following Table:—

| Orders.                 | Diseases.                                | Strength, 1,760. |            |              |        | 1876.                   |         | 1869-75.                |         |
|-------------------------|------------------------------------------|------------------|------------|--------------|--------|-------------------------|---------|-------------------------|---------|
|                         |                                          | Admissions.      | Deaths.    |              |        | Annual Ratio per 1,000. |         | Annual Ratio per 1,000. |         |
|                         |                                          |                  | In Canada. | Of Invalids. | Total. | Admissions.             | Deaths. | Admissions.             | Deaths. |
| I. General Diseases.    |                                          |                  |            |              |        |                         |         |                         |         |
| 1                       | Febrile Group ..                         | 48               | ..         | ..           | ..     | 27·3                    | ..      | 39·0                    | ·53     |
| 2                       | Constitutional „ ..                      | 90               | 1          | 1            | 2      | 51·1                    | 1·14    | 108·1                   | 1·28    |
| II. Local Diseases.     |                                          |                  |            |              |        |                         |         |                         |         |
| 1                       | Nervous system ..                        | 24               | ..         | ..           | ..     | 13·6                    | ..      | 9·5                     | ·75     |
| 2                       | Eye .. ..                                | 16               | ..         | ..           | ..     | 9·1                     | ..      | 14·3                    | ..      |
| 3                       | Ear .. ..                                | 13               | ..         | ..           | ..     | 7·4                     | ..      | 3·0                     | ..      |
| 4                       | Nose .. ..                               | 4                | ..         | ..           | ..     | 2·3                     | ..      | ·5                      | ..      |
| 5                       | Circulatory system ..                    | 33               | ..         | ..           | ..     | 18·7                    | ..      | 8·5                     | 1·37    |
| 6                       | Absorbent „ ..                           | 24               | ..         | ..           | ..     | 13·6                    | ..      | 14·5 {                  | ..      |
| 7                       | Ductless Glands ..                       | ..               | ..         | ..           | ..     | ..                      | ..      |                         | ..      |
| 8                       | Respiratory system ..                    | 166              | 3          | ..           | 3      | 94·3                    | 1·70    | 74·2                    | 1·76    |
| 9                       | Digestive „ ..                           | 233              | 1          | ..           | 1      | 132·4                   | ·57     | 81·9                    | ·40     |
| 10                      | Urinary „ ..                             | 90               | ..         | ..           | ..     | 51·1                    | ..      | 71·9                    | ·26     |
| 11                      | Generative „ ..                          | 10               | ..         | ..           | ..     | 5·7                     | ..      | 9·8                     | ..      |
| 12                      | Organs of Locomotion ..                  | 9                | ..         | ..           | ..     | 5·1                     | ..      | 4·4                     | ·09     |
| 13                      | Cellular Tissue ..                       | 34               | ..         | ..           | ..     | 19·3                    | ..      | 20·0                    | ·04     |
| 14                      | Cutaneous system ..                      | 86               | ..         | ..           | ..     | 48·9                    | ..      | 50·0                    | ·04     |
| III. Conditions, &c.    |                                          |                  |            |              |        |                         |         |                         |         |
|                         | Debility .. ..                           | 3                | ..         | ..           | ..     | 1·7                     | ..      | 4·1                     | ..      |
| IV. Poisons             |                                          |                  |            |              |        |                         |         |                         |         |
|                         | .. ..                                    | 17               | 1          | ..           | 1      | 9·7                     | ·57     | 8·7                     | ·40     |
| V. Injuries.            |                                          |                  |            |              |        |                         |         |                         |         |
| 2                       | Accidental .. ..                         | 182              | ..         | ..           | ..     | 103·4                   | ..      | 89·2                    | ·79     |
| 3                       | Homicidal .. ..                          | ..               | 1          | ..           | 1      | ..                      | ·57     | } 3 {                   | ·09     |
| 4                       | Self-inflicted .. ..                     | ..               | ..         | ..           | ..     | ..                      | ..      |                         | ·48     |
| VI. Surgical Operations |                                          |                  |            |              |        |                         |         |                         |         |
|                         | .. ..                                    | 1                | ..         | ..           | ..     | ·6                      | ..      | ·4                      | ·04     |
|                         | No appreciable disease ..                | 1                | ..         | ..           | ..     | ·6                      | ..      | ·6                      | ..      |
|                         | Total .. ..                              | 1,084            | 7          | 1            | 8      | 615·9                   | 4·55    | 613·8                   | 8·32    |
|                         | Average of 10 years, }<br>1866-75.. .. } | ..               | ..         | ..           | ..     | 642·1                   | 9·27    | ..                      | ..      |

**GENERAL DISEASES.**—In both groups of this class there is an important reduction in the rate of admissions on that of the preceding year.

The admissions and deaths from the principal diseases in the class are shown in the following Table:—

Dominion of  
Canada.

| Diseases.                        | Admitted. | Died. | Ratio per 1,000<br>of Strength. |       |           |       |
|----------------------------------|-----------|-------|---------------------------------|-------|-----------|-------|
|                                  |           |       | 1876.                           |       | 1869-75.  |       |
|                                  |           |       | Admitted.                       | Died. | Admitted. | Died. |
| <i>Febrile—</i>                  |           |       |                                 |       |           |       |
| Eruptive Fevers .. ..            | 7         | ..    | 4.0                             | ..    | 2.1       | .04   |
| Continued .. ..                  | 12        | ..    | 6.8                             | ..    | 17.2      | .36   |
| Paroxysmal .. ..                 | ..        | ..    | ..                              | ..    | 4.6       | ..    |
| Choleraic Diarrhoea .. ..        | 1         | ..    | .6                              | ..    | .2        | ..    |
| Influenza .. ..                  | 24        | ..    | 13.6                            | ..    | 9.5       | ..    |
| Erysipelas .. ..                 | 4         | ..    | 2.3                             | ..    | 4.4       | .09   |
| Other diseases .. ..             | ..        | ..    | ..                              | ..    | 1.0       | .04   |
| Total of Febrile Group ..        | 48        | ..    | 27.3                            | ..    | 39.0      | .53   |
| <i>Constitutional—</i>           |           |       |                                 |       |           |       |
| Rheumatism .. ..                 | 49        | ..    | 27.8                            | ..    | 37.0      | ..    |
| Syphilis .. ..                   | 29        | ..    | 16.5                            | ..    | 63.1      | .04   |
| Scrofula, Phthisis, &c. ..       | 11        | 2     | 6.2                             | 1.14  | 5.8       | 1.10  |
| Scurvy and Purpura .. ..         | 1         | ..    | .6                              | ..    | .5        | ..    |
| Anæmia .. ..                     | ..        | ..    | ..                              | ..    | .5        | ..    |
| Other diseases .. ..             | ..        | ..    | ..                              | ..    | 1.2       | .14   |
| Total of Constitutional Group .. | 90        | 2     | 51.1                            | 1.14  | 108.1     | 1.28  |

*Eruptive Fevers.*—Of the admissions in this group 2 were due to scarlet fever, and 5 to measles.

*Continued Fevers.*—The rate of admissions is only the half of that for the preceding year.

*Choleraic Diarrhoea.*—One admission for this disease (which is stated by the principal medical officer to be of common occurrence amongst the civil population in the hot season) took place.

*Influenza, &c.*—The rate of admissions is less than the half of that for 1875; but the admissions were in excess in that year.

*Erysipelas.*—The proportion of admissions is only the half of that of the preceding year, and no unequal prevalence of the disease in any corps is to be noticed.

*Rheumatism.*—The rate of admissions is 23.3 per 1,000 men lower, or little more than half the rate for 1875.

*Syphilis.*—The rate of prevalence of this disease is nearly the same as that for the preceding year.

*Scrofula, Phthisis, &c.*—The admissions are in a slightly lower rate than that for 1875.

**LOCAL DISEASES.** *Diseases of the Nervous System.*—Nearly half of the admissions in this order were on account of neuralgia.

*Diseases of the Eye,* were in less than half the proportion of the preceding year.

*Diseases of the Circulatory System.*—The rate of admissions is 4.5 per 1,000 lower than that of 1875; two-thirds of the admissions for all diseases in this order were on account of palpitation, a disease of more frequent occurrence in the 87th than in any other Regiment, but most of the corps in the Command return admissions from it.

*Respiratory System.*—There is a small reduction in the rate of admissions on that of the preceding year, in conjunction with which there is a lower death rate.

*Diseases of the Digestive System.*—There is an increase of 17.8 per 1,000

men in the rate of admissions on that of 1875; nearly half of the admissions was due to tonsillitis, and of the remainder more than half was on account of dyspepsia. The death in this order was caused by dysentery, and was that of a man of the 1st Battalion 20th Foot, whose illness was not contracted in the Command.

*Poisons.*—The rate of admissions is higher than that for 1875; *delirium tremens* caused 7 admissions; and *alcohol*, taken in a poisonous quantity, 10.

*INJURIES.*—*Accidental.*—The rate of admissions from injuries of this nature is 18·9 per 1,000 men lower than in the preceding year. *Homicidal.*—The death in this order was from a fracture of the skull, by a kick.

#### *Officers.*

In an average annual strength of 84 officers, there were 49 attacks of illness and 2 deaths, being in the proportions of 583·3 and 23·81 per 1,000 of the strength respectively. One of the deaths is returned as due to congestion of the liver, the other was a sudden death, the cause of which is not stated.

Two officers were invalided during the year.

#### *Women.*

In an average annual strength of 193 women, there were 55 attacks of sickness, being in the rate of 285·0 per 1,000 of the strength. No illness was fatal.

#### *Children.*

In a strength of 408 children of non-commissioned officers and men, there were 244 attacks of sickness and 20 deaths, being in the rates of 598·0 and of 49·02 per 1,000 of the strength respectively. 139 of the illnesses were from measles, 8 were from hooping-cough, 2 are returned as due to remittent fever, 1 to diphtheria, and 4 to croup. The death-rate exceeds that of the children in the Command for the preceding year by 22·19, and it exceeds the average of that of persons (presumably of the same ages) in England by 21·80 per 1,000 of the strength. Of the deaths 1 was due to measles, 1 to remittent fever, 1 to diphtheria, 2 to hooping-cough, 1 to croup, 2 to convulsions, 5 to bronchitis or pneumonia, 3 to diarrhoea, and 4 to debility, one of them being congenital weakness.

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#### SANITARY REPORT.

Deputy Surgeon-General Shelton reports that "the health of the troops in the Dominion of Canada has been very good during the year 1876. Although the strength considerably exceeded that of the preceding year, the admissions to hospital were fewer; and the ratio of deaths due to disease was only 2·84 per mille. The invaliding, however, exceeded that of 1875 by 12 men.

"All the medical officers concur with me in thinking that the ablution-rooms in the several barracks should be furnished with hot water during the cold weather.

"*Hospital.*—There is abundant accommodation in hospital for ordinary cases of sickness, but the want of an isolated hospital for infectious cases—both for soldiers, women, and children—is much felt, as in the event of an epidemic there is really no suitable building available. The few cases of infectious diseases in soldiers have hitherto been treated in separate wards in the Station Hospital, a course attended with some risk, and the sick women and children have been received into the 'Clock Tower' building, which has been temporarily handed over to the Medical Department when required. A small hospital for such cases would render our hospital establishment complete.

"*Drainage.*—The elevated situation of the several barracks (some 234 feet above sea level), added to other conditions, secures excellent drainage.

"*Barracks.*—The barracks occupied by the troops consist of those in the citadel casemates and rooms in the Cavalier (masonry), the Glacis Barracks

*Dominion of Canada.* (built of wood), the Wellington Barracks (brick), and the Artillery Park and South Barracks (both of wood). The troops occupying the first-named are uniformly the more healthy body, even though the general conditions of casemated rooms would not appear to favour this result.

*Latrines.*—Some difficulty exists in keeping the latrines clean owing to their construction, but much attention is paid to them, and with fair success.

"There are no marked sanitary defects to be noticed, and minor ones—such as the absence of verandahs, double windows, &c.—have been or are proposed to be rectified.

*Movement of Troops.*—Some suffering, if not sickness, has been caused by the late period of the year at which reliefs arrive, by reason of the vicissitudes of climate, from Bermuda to Nova Scotia. It must, however, be considered on the other hand, that those men landing at Bermuda from Halifax, are exempted from the effects of the hot climate by reaching that place at a comparatively cool season of the year. The suffering would be diminished if arrangements were made by officers commanding regiments for immediate issue to each man on landing such articles of warm clothing as Government advances them money to purchase.

*Guards.*—A garrison order has been issued directing officers commanding corps to make arrangements so that the men on guard might be supplied with hot coffee or chocolate during the winter months.

*Clothing, &c.*—No change has been made in the clothing of the troops during the year;—it is suitable to the climate. Extra blankets are issued to the troops when the severity of the weather requires it. A skating rink (uncovered) has been made in the Glacis Barrack enclosure; this affords the men the means for outdoor exercise and amusement in winter.

"The following alterations and improvements have been carried out during the year 1876 :—

*Artillery Park Barracks.*—The surface drainage has been improved.

*Citadel.*—The lighting has been improved in four officers' quarters; additional accommodation for 80 men has been secured by raising the roof of the Cavalier. The lighting of the casemated rooms has been improved, as also the flues, and a storehouse for coals for the winter months has also been provided.

*Wellington Barracks.*—The important addition of married quarters for 12 families has been made, and will be ready for occupation early next year. The drying apparatus in the women's washhouse has been rendered efficient by the addition of a chimney shaft. The lighting and ventilation in the boys' school-room have been improved; double window-sashes have been added to half the barrack-rooms."

Surgeon-Major Oliver has called attention, in an annual sanitary report, to a simple device by which all "boilers" (of either the old or new pattern) in military kitchens may be converted into "steamers"; and by means of which also, the accumulation of steam in those places is effectually prevented at a trifling expense.

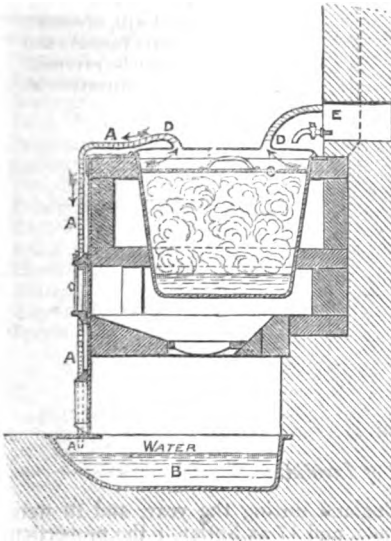
If the boiler should be of the old pattern, having a lid with a steam funnel leading to a condenser in the wall, it will only be necessary to furnish it with a second inner wooden or galvanized iron lid, made to fit and rest in the boiler, two inches beneath the original cover. This will retain the steam in the boiler for any culinary purpose required, and all steam that escapes from beneath this inner lid will be conducted by the outer cover and funnel into the condenser, and so prevented accumulating in the kitchen, as it does at present on all occasions when it is necessary to stop the steam funnels to retain steam in boiler.

Should the boiler be of the new pattern (Deane's), see Figs. 1, 2 and 3, it will be merely necessary to furnish it with an outer instead of an inner lid, having a steam funnel leading either to the water tank beneath the fire grate, or to a condenser on, or in, the wall, and which condenser may be made to act efficiently by being used as a conducting tube for the cold water supply pipe of the boiler.

When the boiler is required for boiling purposes, the one (funnel) lid only is needed, and all steam then generated is conducted away by it to the condenser; but, when it is necessary to convert the "boiler" into a "steamer," both lids are used, as already explained.

When the boiling process has to be forced and protracted, as in the cooking of pea soup, &c., the funnel lid possesses another special advantage as a "steam extinguisher"; for, by giving free vent to excess of heat and steam, it renders it unnecessary for the lid of the boiler to be altogether removed, as at present, to prevent the contents "boiling over," and which latter, in itself, occasions a serious increase of steam accumulation in the kitchen.

FIG. 1.

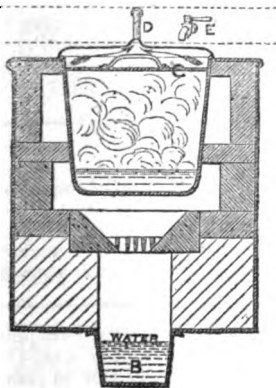


#### ANTEROPSTERIOR SECTION OF BOILER (DEANE'S.)

Shewing A—Tube leading to  
water in fire-  
grate.

- " B—Water-grate.
- " C—Inner lid.
- " D—Outer lid showing  
how steam can be  
conducted either  
to grate or con-  
denser E in wall.

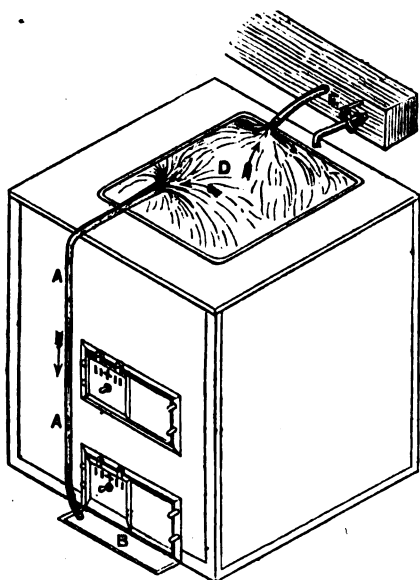
FIG. 2.



#### TRANSVERSE SECTION.

- C—Inner lid.
- D—Outer lid furnished  
with steam funnel.
- E—Condensing tube, with  
cold water pipe pass-  
ing through it.

FIG. 3.



UPPER FRONT VIEW.

One diagram of upper lid is shown in both Figures 1 and 3 acting in two different ways. The lid suggested will, of course, only have *one* steam funnel; and being moveable, can be reversed, and act in either direction as required.

### Section II.

#### *On the Extent of Invaliding.*

Thirty-six invalids were sent to England during the year, and 19 were finally discharged the service (2 in Canada, and 17 at Netley); the proportion of invalids sent home is fractionally in excess of that of last year, whilst that of invalids finally discharged is fractionally less.

The diseases which necessitated invaliding are shown in the following Table:—

| Disabilities.                                    | Invalids<br>sent home<br>from<br>Canada. | Invalids Discharged the<br>Service. |            |
|--------------------------------------------------|------------------------------------------|-------------------------------------|------------|
|                                                  |                                          | In Canada.                          | At Netley. |
| Rheumatism .. .. .                               | 1                                        | ..                                  | 1          |
| Secondary Syphilis .. .. .                       | 5                                        | ..                                  | ..         |
| Scrofula .. .. .                                 | 1                                        | ..                                  | ..         |
| Phthisis .. .. .                                 | 4                                        | 1                                   | ..         |
| Paralysis.. .. .                                 | 1                                        | ..                                  | ..         |
| Mania .. .. .                                    | 1                                        | ..                                  | ..         |
| Dementia .. .. .                                 | 1                                        | ..                                  | ..         |
| Neuralgia .. .. .                                | 2                                        | ..                                  | ..         |
| Chorea .. .. .                                   | 1                                        | ..                                  | 1          |
| Conjunctivitis .. .. .                           | 2                                        | ..                                  | ..         |
| Impaired Vision .. .. .                          | ..                                       | ..                                  | 1          |
| Epistaxis.. .. .                                 | 1                                        | ..                                  | ..         |
| Deafness .. .. .                                 | ..                                       | ..                                  | 1          |
| Valve Disease of Heart.. .. .                    | 3                                        | 1                                   | 4          |
| Palpitation .. .. .                              | 3                                        | ..                                  | 2          |
| Aneurism .. .. .                                 | 1                                        | ..                                  | ..         |
| Varicose Veins .. .. .                           | ..                                       | ..                                  | 1          |
| Enlargement of Glands.. .. .                     | 2                                        | ..                                  | 1          |
| Bronchitis .. .. .                               | 2                                        | ..                                  | 3          |
| Asthma .. .. .                                   | 1                                        | ..                                  | 1          |
| Pleurisy .. .. .                                 | 1                                        | ..                                  | ..         |
| Abcess .. .. .                                   | 1                                        | ..                                  | ..         |
| General Debility .. .. .                         | 1                                        | ..                                  | ..         |
| Sprain .. .. .                                   | 1                                        | ..                                  | 1          |
| Total .. .. .                                    | 36                                       | 2                                   | 17         |
| Ratio per 1,000 of<br>Strength .. { 1876 .. .. . | 20·45                                    | 1·13                                | 9·50       |
| .. { 1866-75 .. .. .                             | 17·00                                    | 2·53                                | 10·93      |

*Section III.**Mean Daily Sick.*

The average number of constantly sick during the year was 51·74, being in the rate of 29·4 per 1,000 of the strength, showing a decrease of 1·0 per 1,000 on that for the preceding year.

The usual information, calculated from these numbers, is given in the following Table :—

|                                                | 1876.          | 1866-75.       |
|------------------------------------------------|----------------|----------------|
| Ratio per 1,000 of Strength constantly Sick .. | 29·4           | 31·17          |
| Average Sick time to each Soldier .. .. .      | days.<br>10·73 | days.<br>11·38 |
| Average duration of each case of Sickness ..   | 17·00          | 17·68          |

Compared with the corresponding rates for 1875, that of the average sick time to each soldier, is fractionally less, whilst that of the average duration of each case of sickness is fractionally greater.

*Dominion of  
Canada.*

*Section IV.*

*On the Influence of Age on the Mortality.*

The death-rates for the several ages (arranged in quinquennial periods) are shown in the following Table :—

|                                                                   | Under<br>20 Years. | 20 and<br>under 25. | 25 and<br>under 30. | 30 and<br>under 35. | 35 and<br>under 40. | 40 and<br>upwards. |
|-------------------------------------------------------------------|--------------------|---------------------|---------------------|---------------------|---------------------|--------------------|
| Ratio of deaths 1876<br>per 1,000 of the<br>Mean Strength 1866-75 | ...                | 5.38                | 2.93                | ...                 | 7.87                | ...                |
|                                                                   | 4.51               | 5.06                | 8.51                | 12.29               | 17.18               | 26.82              |



## V.—ON THE HEALTH OF THE TROOPS SERVING IN BERMUDA.

## Section I.

## Sickness and Mortality.

## STATISTICAL REPORT.

The average annual strength of the non-commissioned officers and men *Bermuda*, serving at Bermuda was 1,934; the admissions into hospital among them were 1,166, the deaths were 18, the average number of sick in hospital throughout the year was 66·42—the rate of admissions is therefore 602·8, that of deaths is 7·76, and that of daily sick is 34·34 per 1,000 of the strength, respectively.

The rate of admissions exceeds that of the preceding year by 1·4 per 1,000 men, the death-rate is 3·29 per 1,000 lower, the average number constantly sick is 1·26 per 1,000 higher.

Some of the most important of the health statistics of the corps which composed the garrison, are shown in the following Table:—

| Corps.                         | Average Annual Strength. | Admissions into Hospital. | Deaths. | Invalids sent Home. | Average daily Sick. | Ratio per 1,000. |         |                     |             | Average Sick-time to each Man. | Average Duration of Cases. |
|--------------------------------|--------------------------|---------------------------|---------|---------------------|---------------------|------------------|---------|---------------------|-------------|--------------------------------|----------------------------|
|                                |                          |                           |         |                     |                     | Admissions.      | Deaths. | Invalids sent Home. | Daily Sick. |                                |                            |
| 7th Brig., Royal Artillery ... | 203                      | 137                       | 2       | 7                   | 11·06               | 674·9            | 9·85    | 34·48               | 54·48       | Days. 19·89                    | Days. 29·47                |
| Royal Engineers ...            | 399                      | 251                       | 6       | 5                   | 10·81               | 629·1            | 15·04   | 12·53               | 27·09       | 9·95                           | 15·72                      |
| *1st Battalion 20th Foot ...   | 526                      | 306                       | 3       | 19                  | 20·79               | 581·7            | 5·70    | 36·12               | 39·52       | 14·43                          | 24·80                      |
| †46th Foot ...                 | 91                       | 56                        | ...     | ...                 | 2·06                | 615·4            | ...     | ...                 | 22·64       | 8·26                           | 13·43                      |
| ‡87th „ ...                    | 44                       | 28                        | ...     | ...                 | 1·84                | 636·4            | ...     | ...                 | 30·49       | 11·12                          | 17·47                      |
| §97th „ ...                    | 604                      | 373                       | 2       | 26                  | 19·47               | 617·5            | 3·31    | 43·05               | 32·24       | 11·77                          | 19·05                      |
| Army Service Corps ...         | 67                       | 15                        | 2       | ...                 | ·89                 | 223·9            | 29·85   | ...                 | 13·28       | 4·86                           | 21·65.                     |
| „ Hospital „ ...               |                          |                           |         |                     |                     |                  |         |                     |             |                                |                            |
| Staff, &c. ...                 |                          |                           |         |                     |                     |                  |         |                     |             |                                |                            |

\* Left the Command in November.

† Arrived in the Command in December.

‡ Arrived in the Command in November.

§ Left the Command in December.

Bermuda.

The admissions and deaths in the various classes and orders of diseases are shown in the following Table:—

| Orders. | Diseases.                          | 1876.<br>Average Strength, 1,934. |             |              |        |                                           |       | 1869-75.                                  |       |
|---------|------------------------------------|-----------------------------------|-------------|--------------|--------|-------------------------------------------|-------|-------------------------------------------|-------|
|         |                                    | Admitted into<br>Hospital.        | Deaths.     |              |        | Annual ratio<br>per 1,000 of<br>Strength. |       | Annual ratio<br>per 1,000 of<br>Strength. |       |
|         |                                    |                                   | At Bermuda. | Of Invalids. | Total. | Admitted.                                 | Died. | Admitted.                                 | Died. |
|         | <b>I. General Diseases.</b>        |                                   |             |              |        |                                           |       |                                           |       |
| 1       | Febrile Group ..                   | 61                                | 4           | ..           | 4      | 31·5                                      | 2·07  | 76·9                                      | 2·35  |
| 2       | Constitutional „ ..                | 167                               | 3           | ..           | 3      | 86·3                                      | 1·55  | 76·7                                      | 2·13  |
|         | <b>II. Local Diseases.</b>         |                                   |             |              |        |                                           |       |                                           |       |
|         | Diseases of the—                   |                                   |             |              |        |                                           |       |                                           |       |
| 1       | Nervous System ..                  | 18                                | 2           | ..           | 2      | 9·3                                       | 1·03  | 10·2                                      | 1·29  |
| 2       | Eye .. ..                          | 35                                | ..          | ..           | ..     | 18·1                                      | ..    | 20·5                                      | ..    |
| 3       | Ear .. ..                          | 10                                | ..          | ..           | ..     | 5·2                                       | ..    | 3·6                                       | ..    |
| 4       | Nose .. ..                         | 1                                 | ..          | ..           | ..     | ·5                                        | ..    | ·3                                        | ..    |
| 5       | Circulatory System ..              | 31                                | 3           | ..           | 3      | 16·0                                      | 1·55  | 8·3                                       | 1·67  |
| 6       | Absorbent „ ..                     | 35                                | ..          | ..           | ..     | 18·1                                      | ..    | 11·9                                      | ..    |
| 8       | Respiratory „ ..                   | 88                                | 1           | ..           | 1      | 45·5                                      | ·52   | 35·7                                      | ·45   |
| 9       | Digestive „ ..                     | 224                               | 1           | ..           | 1      | 115·8                                     | ·52   | 164·0                                     | ·91   |
| 10      | Urinary „ ..                       | 52                                | 1           | ..           | 1      | 26·9                                      | ·52   | 29·1                                      | ·30   |
| 11      | Generative „ ..                    | 10                                | ..          | ..           | ..     | 5·2                                       | ..    | 8·7                                       | ..    |
| 12      | Organs of Locomotion ..            | 7                                 | ..          | ..           | ..     | 3·6                                       | ..    | 3·2                                       | ·08   |
| 13      | Cellular Tissue ..                 | 39                                | ..          | ..           | ..     | 20·2                                      | ..    | 28·4                                      | ·08   |
| 14      | Cutaneous System ..                | 100                               | ..          | ..           | ..     | 51·7                                      | ..    | 66·2                                      | ·08   |
|         | <b>III. Debility</b> ..            | 18                                | ..          | ..           | ..     | 9·3                                       | ..    | 7·6                                       | ..    |
|         | <b>IV. Poisons</b> ..              | 12                                | ..          | ..           | ..     | 6·2                                       | ..    | 20·1                                      | ·61   |
|         | <b>V. Injuries.</b>                |                                   |             |              |        |                                           |       |                                           |       |
| 2       | Accidental. „ ..                   | 256                               | ..          | ..           | ..     | 132·4                                     | ..    | 112·4                                     | 1·37  |
| 3       | Self-inflicted „ ..                | ..                                | ..          | ..           | ..     | ..                                        | ..    | ·6                                        | ·99   |
|         | <b>VI. Surgical Operations.</b> .. | ..                                | ..          | ..           | ..     | ..                                        | ..    | ·1                                        | ..    |
|         | No appreciable disease ..          | 2                                 | ..          | ..           | ..     | 1·0                                       | ..    | ·5                                        | ..    |
|         | <b>Total</b> .. ..                 | 1,166                             | 15          | ..           | 15     | 602·8                                     | 7·76  | 685·0                                     | 12·31 |
|         | Average of 10 years, 1866-75       | ..                                | ..          | ..           | ..     | 706·0                                     | 14·73 | ..                                        | ..    |

**GENERAL DISEASES.**—The proportion of diseases in this class is less by 16·3 per 1,000 men, than in the preceding year; the whole of the decrease is in the *febrile group*. The *constitutional group* shows a higher rate; with a decreased prevalence of fevers however, the rate of mortality was higher—nearly twice as great,—and, conversely, whilst the prevalence of constitutional diseases was greater, the mortality due to them was less than in 1875.

The admissions and deaths from the principal diseases in this class, are shown in the following Table:—

| Diseases.                        | Admitted. | Died. | Ratio per 1,000 of Mean Strength. |       |           |       |
|----------------------------------|-----------|-------|-----------------------------------|-------|-----------|-------|
|                                  |           |       | 1876.                             |       | 1869-75.  |       |
|                                  |           |       | Admitted.                         | Died. | Admitted. | Died. |
| <b>Febrile—</b>                  |           |       |                                   |       |           |       |
| Eruptive Fevers .. .. .          | 1         | 1     | .5                                | .52   | .1        | ..    |
| Continued „ .. .. .              | 57        | 3     | 29.5                              | 1.55  | 65.5      | 2.28  |
| Paroxysmal „ .. .. .             | ..        | ..    | ..                                | ..    | 1.4       | ..    |
| Influenza .. .. .                | 2         | ..    | 1.0                               | ..    | 9.2       | ..    |
| Erysipelas .. .. .               | 1         | ..    | .5                                | ..    | .3        | .07   |
| Other diseases.. .. .            | ..        | ..    | ..                                | ..    | .4        | ..    |
| Total of Febrile Group .. ..     | 61        | 4     | 31.5                              | 2.07  | 76.9      | 2.35  |
| <b>Constitutional—</b>           |           |       |                                   |       |           |       |
| Rheumatism .. .. .               | 83        | ..    | 42.9                              | ..    | 35.5      | ..    |
| Syphilis .. .. .                 | 62        | ..    | 32.0                              | ..    | 30.9      | .07   |
| Scrofula, Phthisis, &c. .. ..    | 18        | 2     | 9.3                               | 1.03  | 8.7       | 1.90  |
| Anæmia .. .. .                   | 3         | ..    | 1.5                               | ..    | .8        | ..    |
| Other diseases.. .. .            | 1         | 1     | .5                                | .52   | .8        | .16   |
| Total of Constitutional Group .. | 167       | 3     | 86.2                              | 1.55  | 76.7      | 2.13  |

*Eruptive Fevers.*—The admission in this group was from scarlet fever.

*Continued Fevers.*—*Enteric fever*, caused 6 admissions; 3 of the attacks were fatal. Three of the admissions for this form of fever were those of men of the 97th regiment, 1 was from the Royal Artillery, 1 from the Royal Engineers, and 1 from the 1st Battalion 20th Foot. The Medical Officer of the St. George's Station Hospital remarks that enteric fever is endemic in the town, the sanitary state of it being very defective. *Simple continued fever*, caused only 3 admissions; 48 men were admitted for *febricula*, a disease of disproportionately frequent occurrence in the 1st Battalion 20th.

*Paroxysmal Fevers.*—No admission for any form of paroxysmal fever occurred during the year; it will be seen that the station has almost an immunity from fevers of this kind, the rate of prevalence for seven years being only 1.4 per 1,000 men. This is the more remarkable as the garrison largely consists of men who have previously served in the West India Command.

*Rheumatism.*—The rate of admissions is one-fourth higher than that for the preceding year.

*Syphilis.*—The rate of prevalence is a little lower than that for 1875.

*Scrofula, Phthisis, &c.*—With a higher admission-rate, that of mortality from diseases of this nature is lower than for the preceding year.

**LOCAL DISEASES.**—*Diseases of the Nervous System.*—One-third of the admissions in this order were due to epilepsy, and one-third to neuralgia; the deaths were caused by sunstroke 1, by tumor in the brain 1.

*Diseases of the Eye.*—The rate of admissions is 2.9 per 1,000 men lower than that for the preceding year, in which however there was a greatly increased prevalence.

*Diseases of the Circulatory System.*—The rate of admissions is nearly double that for the preceding year; this is due to the large increase in the admissions for palpitation, a disease not considerably more prevalent in one corps than in the others.

*Diseases of the Digestive System.*—The rate of admissions is 33 per 1,000 men lower than the corresponding one of the preceding year; that of mortality is also lower. Tonsillitis, dyspepsia, and diarrhoea, were the diseases which caused a majority of the admissions in this order, but the occurrence of

*Bermuda.*

dysentery, 15 admissions, and of hepatitis 11, shows the distinctly tropical character impressed on the illnesses of men serving in the Command; in one instance, hepatic abscess was a sequel of the last-named disease.

*Urinary System.*—The number of admissions is exactly the same as in the preceding year, and the rate of prevalence is only fractionally different.

*Poisons.*—The rate of prevalence is the same as that for the preceding year; 10 of the admissions were due to delirium tremens, and 2 to accidental poisoning, in one instance by oxalic acid, in the other by castor-oil seeds.

*INJURIES.—Accidental.*—The rate of admissions exceeds that for 1875 by 21 per 1,000 men.

*Officers.*

In an annual average strength of 98 officers there were 26 attacks of illness, being in the rate of 265·3 per 1,000 of the strength; no officer died. One officer was invalided.

*Women.*

In an average annual strength of 203 wives of non-commissioned officers and men, only 49 attacks of illness are returned. There were 2 deaths, being in the rate of 9·85 per 1,000 of the strength; 1 was due to phthisis and 1 to pneumonia.

*Children.*

In an average annual strength of 388 children of non-commissioned officers and men, there were 93 attacks of illness, being in the rate of 239·7 per 1,000 of the strength, and 16 deaths, being in the rate of 41·24 per 1,000. This exceeds the death-rate of persons in England, presumably of the same ages, by 14·02 per 1,000. The more important kinds of diseases affecting the children in the Command, during the year, were hooping cough 20 attacks, and diarrhœa 28. There were only 3 attacks of eruptive fever, namely, scarlet fever. Only 1 attack of enteric fever is returned, but the fact of a relatively large mortality from diarrhœa, coupled with the fact that enteric fever, prevailed both amongst the men and in the civil population, requires to be kept in view in connexion with this comparative exemption of the class most susceptible to the invasion of the disease. The deaths were due to hooping-cough 1, hydrocephalus 1, convulsions and teething 3, diarrhœa 8, constipation 1, general debility 2.

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 SANITARY REPORT.

Deputy Surgeon-General Sinclair reports that “the general state of health of the troops serving in the Bermuda Command during the year 1876 has been good; no particular disease has prevailed, and there has been no epidemic.

“A few cases of enteric fever occurred among the men of the Royal Artillery and 97th Regiment at St. George’s, which Surgeon-Major O’Farrell considered were due to the supply of water for flushing purposes being occasionally intermittent, and thus allowing foul gases to accumulate in the drains. Every effort has since been made to have a continuous supply, and the disease has not spread.

“One case of enteric fever proved fatal at Boaz, and was attributed by Surgeon Sanders to the man having been employed in cleaning out a choked and offensive drain. I made a careful inspection of the drainage of Boaz at the time, and found several imperfections. The situation is low, and the drains have been constructed too large to be properly flushed. The Royal Engineer Department have introduced several ventilators, and cut off the connection with the barrack buildings, and no further cases of fever occurred. The drainage of Boaz will probably have to be entirely relaid.

“Intemperance continues to be an important cause of disease.

"The barrack accommodation is insufficient for the number of troops in the island, and a large number of the Royal Artillery are always under canvas at St. George's. Their health does not appear to have materially suffered, but it is very desirable for their comfort that hut or barrack accommodation should be provided for them, as during stormy weather the tents are occasionally blown down, and the men's clothing and kits become wetted with rain.

"The accommodation for married soldiers and their families is also very limited at St. George's.

"Medical officers report that all sanitary arrangements in connection with barracks and hospitals have been satisfactorily carried out; that the conservancy is effective, and cleanliness carefully attended to; that the means of ablution is sufficient and regularly used; that the water supply is good and sufficient in quantity, stored in tanks above ground, so that there can be no soakage; that the quality of the bread and meat is excellent, and the men well satisfied with the way in which their food is prepared; that the duties are light, and the men chiefly employed on the public works with advantage to their health. There is no gymnasium in the islands, but cricket is much played.

"The station hospitals are in good working order, and sufficient for the requirements of the sick. A women's hospital is much required at Prospect, which is a camp, and the married people occupy huts. A hut for infectious diseases occurring amongst women and children should be erected in the vicinity of each of the men's hospitals for infectious diseases. Women and children are often the first victims of epidemic disease, and unless the early cases can be isolated the infection rapidly extends to the men.

"The following sanitary improvements are being effected:—The water supply to the huts at St. George's is to be increased by the construction of an additional tank. Two blocks of the new barracks at St. George's are now complete and occupied by the 87th Regiment. The soldiers' latrines and urinals at Ireland Island are to be reconstructed. At Boaz improvements have been made to the drainage generally, and the married quarters are being ventilated. A swimming-bath for the men at Prospect has been completed at Navy Wells. Steps are being taken to remedy the defects noted in the annual inspection reports."

## Section II.

### *On the Extent of Invaliding.*

Fifty-seven invalids were sent home from the Command, and 22 were discharged the service at Netley during the year. The proportion of invalids sent home is 9.54 per 1,000, or one-third higher than that for 1875; that of men finally discharged is fractionally higher.

The classes and orders of diseases to which the invaliding was due are shown in the following Table:—

*Bermuda.*

| Class.                                | Order. | Diseases.                   | Invalids sent Home. | Discharged the Service at Home. |
|---------------------------------------|--------|-----------------------------|---------------------|---------------------------------|
| I.                                    | 2      | Rheumatism .. .. .          | 2                   | 1                               |
|                                       |        | Secondary Syphilis .. .. .  | 4                   | 2                               |
|                                       |        | Scrofula .. .. .            | 1                   | ..                              |
|                                       |        | Phthisis .. .. .            | 13                  | ..                              |
| II.                                   | 1      | Diseases of the—            |                     |                                 |
|                                       |        | Nervous System .. .. .      | 2                   | 1                               |
|                                       |        | Eye .. .. .                 | 6                   | 2                               |
|                                       |        | Ear .. .. .                 | 2                   | 2                               |
|                                       |        | Circulatory System .. .. .  | 9                   | 6                               |
|                                       |        | Absorbent .. .. .           | 1                   | ..                              |
|                                       |        | Respiratory .. .. .         | 1                   | ..                              |
|                                       |        | Digestive .. .. .           | 4                   | 1                               |
|                                       |        | Urinary .. .. .             | 3                   | 2                               |
|                                       |        | Locomotive .. .. .          | 1                   | ..                              |
| III.                                  | 14     | Cutaneous .. .. .           | ..                  | 2                               |
|                                       |        | Debility .. .. .            | 6                   | ..                              |
| V.                                    |        | Injuries .. .. .            | 2                   | 1                               |
| VI.                                   |        | Surgical Operations .. .. . | ..                  | 2                               |
| Total .. .. .                         |        |                             | 57                  | 22                              |
| Ratio per 1,000 of Strength { 1876 .. |        |                             | 29·47               | 11·37                           |
| { 1866-75 ..                          |        |                             | 22·47               | 14·21                           |

*Section III.**Mean Daily Sick.*

The average number of non-commissioned officers and men in hospital daily throughout the year, was 66·42.

Certain particulars, calculated from the number of constantly sick, are shown in the following Table:—

|                                                | 1876.       | 1866-75.    |
|------------------------------------------------|-------------|-------------|
| Ratio per 1,000 of Strength constantly Sick .. | 34·34       | 35·47       |
| Average Sick time to each Soldier .. .. .      | Days. 12·54 | Days. 12·94 |
| Average duration of each case of Sickness..    | 20·79       | 18·33       |

All the rates are fractionally higher than those for 1875.

*Section IV.**On the Influence of Age on the Mortality.*

The rates of mortality for the several ages, arranged in quinquennial periods, are shown in the following Table:—

|                                                      | Under 20. | 20 and under 25. | 25 and under 30. | 30 and under 35. | 35 and under 40. | 40 and upwards. |
|------------------------------------------------------|-----------|------------------|------------------|------------------|------------------|-----------------|
| Ratio of deaths per 1,000 of mean strength { 1876 .. | ..        | 2·71             | 8·66             | ..               | ..               | 66·66           |
| { 1866-75                                            | 4·07      | 7·11             | 12·36            | 21·51            | 30·19            | 14·63           |

## VI.—ON THE HEALTH OF THE TROOPS SERVING IN THE WEST INDIES.

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### Section I.

#### *Sickness and Mortality.*

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#### STATISTICAL REPORT.\*

##### I. WHITE TROOPS.

In an annual average strength of 1,086 non-commissioned officers and men, there were 823 admissions into hospital, and, including that of an invalid on his passage home, 4 deaths, the average number of constantly sick was 44·95; the admissions are therefore in the rate of 757·8, the deaths of 3·68, and the constantly sick of 41·44 per 1,000 of the mean annual strength respectively. Compared with the corresponding rate of the preceding year, that of admissions is lower by 84·8, that of deaths by 5·16, and that of constantly sick by 34 per 1,000 men.

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Command.*

The troops in the Command consisted of the 5th and 6th Batteries of the 7th Brigade Royal Artillery, of the 35th Foot, and of details of the Royal Engineers, Army Hospital Corps and Garrison Staff, and of Staff Sergeants of the West Indian Regiments, and of the Military Labourers. The stations occupied were Barbados, Trinidad, and Jamaica.

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\* Compiled from the Monthly Returns of the Command.

West Indies  
Command.

The admissions and deaths in the various classes and orders of diseases, are shown in the following Table:—

| Orders. | White Troops.                             | 1876.            |                 |              |        |                  |       | 1869-75.         |       |
|---------|-------------------------------------------|------------------|-----------------|--------------|--------|------------------|-------|------------------|-------|
|         |                                           | Strength, 1,086. |                 |              |        | Ratio per 1,000. |       | Ratio per 1,000. |       |
|         |                                           | Admitted.        | Died.           |              |        | Admitted.        | Died. | Admitted.        | Died. |
|         |                                           |                  | In West Indies. | Of Invalids. | Total. |                  |       |                  |       |
|         | <b>I. General Diseases.</b>               |                  |                 |              |        |                  |       |                  |       |
| 1       | Febrile Group                             | 113              | ..              | ..           | ..     | 104.1            | ..    | 194.2            | 4.94  |
| 2       | Constitutional ..                         | 98               | ..              | 1            | 1      | 90.2             | .92   | 106.8            | 2.08  |
|         | <b>II. Local Diseases.</b>                |                  |                 |              |        |                  |       |                  |       |
| 1       | Nervous System ..                         | 13               | 1               | ..           | 1      | 12.0             | .92   | 11.6             | .88   |
| 2       | Eye .. ..                                 | 7                | ..              | ..           | ..     | 6.4              | ..    | 11.5             | ..    |
| 3       | Ear .. ..                                 | 2                | ..              | ..           | ..     | 1.8              | ..    | 8.8              | ..    |
| 4       | Nose .. ..                                | ..               | ..              | ..           | ..     | ..               | ..    | .5               | ..    |
| 5       | Circulatory System ..                     | 11               | 1               | ..           | 1      | 10.1             | .92   | 12.1             | .99   |
| 6       | Absorbent .. ..                           | 15               | ..              | ..           | ..     | 13.8             | ..    | 21.7             | ..    |
| 7       | Ductless Glands ..                        | ..               | ..              | ..           | ..     | ..               | ..    | .2               | ..    |
| 8       | Respiratory System ..                     | 32               | 1               | ..           | ..     | 29.5             | ..    | 32.9             | .23   |
| 9       | Digestive .. ..                           | 163              | 1               | ..           | 1      | 150.1            | .92   | 122.7            | .66   |
| 10      | Urinary .. ..                             | 70               | ..              | ..           | ..     | 64.5             | ..    | 102.5            | .11   |
| 11      | Generative .. ..                          | 19               | ..              | ..           | ..     | 17.5             | ..    | 13.6             | ..    |
| 12      | Organs of Locomotion ..                   | 6                | ..              | ..           | ..     | 5.5              | ..    | 5.3              | ..    |
| 13      | Cellular Tissue ..                        | 15               | ..              | ..           | ..     | 13.8             | ..    | 26.8             | ..    |
| 14      | Cutaneous System ..                       | 107              | ..              | ..           | ..     | 98.5             | ..    | 84.3             | ..    |
|         | <b>III. Conditions, &amp;c.</b>           |                  |                 |              |        |                  |       |                  |       |
|         | Debility .. ..                            | 26               | ..              | ..           | ..     | 23.9             | ..    | 10.2             | .11   |
|         | <b>IV. Poisons</b> .. ..                  | 5                | ..              | ..           | ..     | 4.6              | ..    | 20.8             | .66   |
|         | <b>V. Injuries.</b>                       |                  |                 |              |        |                  |       |                  |       |
| 3       | Accidental .. ..                          | 120              | ..              | ..           | ..     | 110.6            | ..    | 123.4            | .77   |
| 4       | Self-inflicted .. ..                      | ..               | ..              | ..           | ..     | ..               | ..    | .3               | .22   |
|         | <b>VI. Surgical Operations..</b> ..       | 1                | ..              | ..           | ..     | .9               | ..    | .2               | ..    |
|         | No appreciable disease .. ..              | ..               | ..              | ..           | ..     | ..               | ..    | 1.1              | ..    |
|         | <b>Total..</b> ..                         | 823              | 3               | 1            | 4      | 757.8            | 3.68  | 911.5            | 11.64 |
|         | <b>Average of 10 years, 1866-75 ..</b> .. | ..               | ..              | ..           | ..     | 998.6            | 16.47 | ..               | ..    |

GENERAL DISEASES.—The rate of admissions is 27.6 per 1,000 men lower than in 1875; the whole of the reduction is in the *constitutional group*; the rate for the *febrile group*, is higher.

The admissions and deaths from the principal diseases in this class, are shown in the following Table:—



| White Troops.                    |    |    |    | 1876.             |       |                     |       | 1869-75.            |       | <i>West Indies<br/>Command.</i> |
|----------------------------------|----|----|----|-------------------|-------|---------------------|-------|---------------------|-------|---------------------------------|
| General Diseases.                |    |    |    | Strength<br>1,086 |       | Ratio per<br>1,000. |       | Ratio per<br>1,000. |       |                                 |
|                                  |    |    |    | Admitted.         | Died. | Admitted.           | Died. | Admitted.           | Died. |                                 |
| <i>Febrile—</i>                  |    |    |    |                   |       |                     |       |                     |       |                                 |
| Eruptive Fevers..                | .. | .. | .. | ..                | ..    | ..                  | ..    | 8                   | ..    |                                 |
| Continued "                      | .. | .. | .. | 93                | ..    | 85.6                | ..    | 125.5               | 2.19  |                                 |
| Yellow "                         | .. | .. | .. | ..                | ..    | ..                  | ..    | 4.8                 | 1.65  |                                 |
| Paroxysmal "                     | .. | .. | .. | 17                | ..    | 15.7                | ..    | 59.2                | 1.10  |                                 |
| Influenza                        | .. | .. | .. | 1                 | ..    | .9                  | ..    | 2.2                 | ..    |                                 |
| Erysipelas                       | .. | .. | .. | 1                 | ..    | .9                  | ..    | 1.2                 | ..    |                                 |
| Other diseases                   | .. | .. | .. | 1                 | ..    | .9                  | ..    | 1.0                 | ..    |                                 |
| Total of Febrile Group ..        |    |    |    | 113               | ..    | 104.0               | ..    | 194.2               | 4.94  |                                 |
| <i>Constitutional—</i>           |    |    |    |                   |       |                     |       |                     |       |                                 |
| Rheumatism                       | .. | .. | .. | 28                | ..    | 25.8                | ..    | 21.1                | ..    |                                 |
| Syphilis                         | .. | .. | .. | 61                | ..    | 56.1                | ..    | 64.4                | ..    |                                 |
| Scrofula, Phthisis, &c.          | .. | .. | .. | 5                 | 1     | 4.6                 | .92   | 8.7                 | 2.08  |                                 |
| Scurvy and Purpura               | .. | .. | .. | ..                | ..    | ..                  | ..    | .1                  | ..    |                                 |
| Anæmia                           | .. | .. | .. | 4                 | ..    | 3.7                 | ..    | 11.2                | ..    |                                 |
| Other diseases                   | .. | .. | .. | ..                | ..    | ..                  | ..    | 1.3                 | ..    |                                 |
| Total of Constitutional Group .. |    |    |    | 98                | 1     | 90.2                | .92   | 106.8               | 2.08  |                                 |

*Continued Fevers.*—The rate of admissions is 20.2 per 1,000 men higher than in the preceding year.

*Enteric Fever*, caused only 1 admission.

*Simple Continued Fever*, and *Febricula*, together caused 92 admissions, the greatest prevalence being in the second quarter of the year; no attack ended fatally.

*Paroxysmal Fevers.*—The rate of admissions is 8.2 per 1,000 men lower than that of 1875. There were 6 admissions for *remittent fever*; all the others were for *ague*.

*Rheumatism.*—The rate of prevalence is 5.1 per 1,000 men lower than in the preceding year.

*Syphilis.*—The rate of admissions is 17.3 per 1,000 men lower than in the preceding year.

*Scrofula, Phthisis, &c.*—The proportional prevalence is little more than the half of that of 1875.

**LOCAL DISEASES.**—Each group of diseases in this class shows a lower rate than in the preceding year, except that of diseases of the *cutaneous system*. The most important reductions are in those of the *absorbent, respiratory, and urinary systems*. For diseases of the *digestive system* the decrease is only 2.9 per 1,000 men, but the rate of mortality from them is little more than one-fourth of that in 1875.

**CONDITIONS, &c.—Debility.**—The rate of admissions is more than double that of the preceding year.

**Poisons.**—The rate of admissions is 6.9 per 1,000 men lower than in 1875.

**INJURIES.—Accidental.**—The rate of admissions is 4.4 per 1,000 men lower than in 1875.

*West Indies  
Command.*

## II. BLACK TROOPS.\*

The Black Troops serving in the Command, consisted of a wing of the 1st West India Regiment, of the 2nd West India Regiment, and of a detachment of Military Labourers.

The stations occupied were, Demerara, Trinidad, Barbados, Jamaica, Honduras, and Bahamas ; for a short time also a detachment was stationed at Tobago.

The average annual strength of the force was 1,020 non-commissioned officers and men (exclusive of White Staff Sergeants), the admissions into hospital were 1,214, the deaths 19, and the average number of constantly sick 57; the proportions given by these numbers are, for admissions 1,190, for deaths 18·62, and for constantly sick 55·88 per 1,000 of the strength respectively. Contrasted with the corresponding proportions of the preceding year, that of admissions is 174·5 per 1,000 men higher, that of deaths is 1·45 higher, but the constantly sick rate is 2·93 per 1,000 lower.

The admissions in the different classes and orders of diseases, are shown in the following Table :—

| Orders. | Black Troops.                   | 1876.              |       |                     |       | 1869-75.            |       |
|---------|---------------------------------|--------------------|-------|---------------------|-------|---------------------|-------|
|         |                                 | Strength<br>1,020. |       | Ratio per<br>1,000. |       | Ratio per<br>1,000. |       |
|         |                                 | Admitted.          | Died. | Admitted.           | Died. | Admitted.           | Died. |
|         | <b>I. General Diseases.</b>     |                    |       |                     |       |                     |       |
| 1       | Febrile Group .. ..             | 289                | 2     | 283·3               | 1·96  | 168·3               | 2·26  |
| 2       | Constitutional „ ..             | 256                | 11    | 251·0               | 10·78 | 245·4               | 8·33  |
|         | <b>II. Local Diseases.</b>      |                    |       |                     |       |                     |       |
|         | Diseases of the—                |                    |       |                     |       |                     |       |
| 1       | Nervous System .. ..            | 13                 | ..    | 12·7                | ..    | 19·7                | 1·44  |
| 2       | Eye .. ..                       | 21                 | ..    | 20·6                | ..    | 17·7                | ..    |
| 3       | Ear .. ..                       | 5                  | ..    | 4·9                 | ..    | 2·6                 | ..    |
| 4       | Nose .. ..                      | ..                 | ..    | ..                  | ..    | ·8                  | ..    |
| 5       | Circulatory System ..           | 18                 | 1     | 17·6                | ·98   | 9·0                 | 1·65  |
| 6       | Absorbent „ ..                  | 14                 | ..    | 13·7                | ..    | 23·0                | ..    |
| 8       | Respiratory „ ..                | 66                 | 1     | 64·7                | ·98   | 59·2                | 2·58  |
| 9       | Digestive „ ..                  | 97                 | 1     | 95·1                | ·98   | 91·7                | 1·54  |
| 10      | Urinary „ ..                    | 179                | 2     | 175·6               | 1·96  | 136·7               | ·82   |
| 11      | Generative „ ..                 | 32                 | ..    | 31·4                | ..    | 21·6                | ..    |
| 12      | Organs of Locomotion ..         | 6                  | ..    | 5·9                 | ..    | 11·4                | ·41   |
| 13      | Cellular Tissue .. ..           | 37                 | 1     | 36·3                | ·98   | 21·5                | ..    |
| 14      | Cutaneous System .. ..          | 93                 | ..    | 91·2                | ..    | 81·8                | ..    |
|         | <b>III. Conditions, &amp;c.</b> |                    |       |                     |       |                     |       |
|         | Debility .. ..                  | 5                  | ..    | 4·9                 | ..    | 4·6                 | ·10   |
|         | <b>IV. Poisons</b> .. ..        | 2                  | ..    | 2·0                 | ..    | 3·0                 | ·21   |
|         | <b>V. Injuries.</b>             |                    |       |                     |       |                     |       |
| 1       | Battle .. ..                    | ..                 | ..    | ..                  | ..    | 1·3                 | ..    |
| 2       | Accidental .. ..                | 79                 | ..    | 77·1                | ..    | 99·0                | ·41   |
| 4       | Self-inflicted .. ..            | 1                  | ..    | 1·0                 | ..    | ·1                  | ·62   |
|         | <b>VI. Surgical Operations.</b> | ..                 | ..    | ..                  | ..    | 1·1                 | ..    |
|         | No appreciable disease ..       | 1                  | ..    | 1·0                 | ..    | ·9                  | ·10   |
|         | <b>Total</b> .. ..              | 1,214              | 19    | 1190·0              | 18·62 | 1020·4              | 20·47 |
|         | Average of 10 years, 1866-75..  | ..                 | ..    | 1058·3              | 22·01 | ..                  | ..    |

\* Compiled from the Monthly Returns of the Command.

**GENERAL DISEASES.**—The rate of admissions for diseases of this class is 134·5 *West Indies* per 1,000 men higher than in 1875; the whole of the excess is in the *febrile* Command.  
*group*; for diseases of the *constitutional group*, there is a decrease of 27 per 1,000 men. The rate of mortality for the class is higher than that for the preceding year by 1·30 per 1,000 men. The rate of the *febrile group*, is less than the half of that of 1875, whilst for the *constitutional group*, there is an increase of 4·24 per 1,000 men.

The admissions and deaths from the principal diseases of this class, are shown in the following Table:—

| Black Troops.                    | 1876.               |       |                    |       | 1869-75.           |       |
|----------------------------------|---------------------|-------|--------------------|-------|--------------------|-------|
|                                  | Strength,<br>1,020. |       | Ratio per<br>1,000 |       | Ratio per<br>1,000 |       |
|                                  | Admitted.           | Died. | Admitted.          | Died. | Admitted.          | Died. |
| <b>General Diseases.</b>         |                     |       |                    |       |                    |       |
| <i>Febrile Group—</i>            |                     |       |                    |       |                    |       |
| Eruptive Fevers .. .. .          | 1                   | ..    | 1·0                | ..    | 5·5                | ·10   |
| Continued „ .. .. .              | 65                  | ..    | 63·7               | ..    | 44·6               | ·82   |
| Yellow „ .. .. .                 | ..                  | ..    | ..                 | ..    | ·6                 | ·10   |
| Paroxysmal „ .. .. .             | 220                 | 2     | 215·7              | 1·96  | 111·2              | 1·14  |
| Influenza. . . . .               | ..                  | ..    | ..                 | ..    | 1·3                | ..    |
| Erysipelas .. .. .               | 3                   | ..    | 2·9                | ..    | ·1                 | ..    |
| Other diseases .. .. .           | ..                  | ..    | ..                 | ..    | 5·0                | ·10   |
| Total of Febrile Group .. ..     | 289                 | 2     | 283·3              | 1·96  | 168·3              | 2·26  |
| <i>Constitutional Group—</i>     |                     |       |                    |       |                    |       |
| Rheumatism .. .. .               | 85                  | ..    | 83·3               | ..    | 68·5               | ·10   |
| Syphilis .. .. .                 | 148                 | ..    | 145·1              | ..    | 147·7              | ·21   |
| Scrofula, Phthisis, &c. .. ..    | 21                  | 11    | 20·6               | 10·78 | 26·8               | 7·92  |
| Scurvy and Purpura .. .. .       | ..                  | ..    | ..                 | ..    | ·2                 | ..    |
| Anæmia .. .. .                   | 2                   | ..    | 2·0                | ..    | 1·4                | ..    |
| Other diseases .. .. .           | ..                  | ..    | ..                 | ..    | ·8                 | ·10   |
| Total of Constitutional Group .. | 256                 | 11    | 251·0              | 10·78 | 245·4              | 8·33  |

*Eruptive Fevers.*—The admission was for measles.

*Continued Fevers.*—The rate of admissions exceeds that of the preceding year by 38·4 per 1,000 men, being considerably more than double.

*Paroxysmal Fevers.*—The rate of admissions exceeds that for the preceding year by 125·7 per 1,000 men.

*Rheumatism.*—The rate of admissions exceeds that for 1875 by 17·1 per 1,000 men.

*Syphilis.*—The rate of admissions is lower by 36·9 per 1,000 men, than that of the preceding year.

*Scrofula, Phthisis, &c.*—Whilst the rate of admissions is lower than that of the preceding year by 8·8 per 1,000 men, the rate of deaths is 4·24 per 1,000 higher. The rate of prevalence of diseases of this nature is more than four times higher, and the rate of deaths is more than ten times higher than in the case of the White Troops serving in the West India Command, in the present year.

**LOCAL DISEASES.**—The rates of prevalence of *diseases of the nervous system, of the eye, of the absorbent system, and of the organs of locomotion*, are lower than the corresponding ones for 1875, whilst the rates for diseases of the *circulatory, respiratory, digestive, urinary, generative, and cutaneous systems*,

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and for *diseases of the cellular tissue*, are higher; for the *respiratory system*, the increase amounts 23; and for the *urinary system*, to 32·5 per 1,000 men; in each of the other instances the increase is not material.

**INJURIES.**—*Accidental.*—The rate of admissions is lower than in 1875, by 20·2 per 1,000 men.

## Section II.

### *On the Extent of Invaliding.*

Five non-commissioned officers and men of the White Troops were invalided home, and 4 invalids from the Command were finally discharged the service at Netley during the year.

38 non-commissioned officers and men of the Black Troops serving in the West India and in the West Africa Settlements Commands, were discharged the Service during the year.

|                                                         | White Troops.                                                                                                           |                                      | Black Troops.                                                                                                                                          |
|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                         | Windward and Leeward Islands<br>Command.                                                                                |                                      | West Indies and<br>West Africa<br>Settlements.                                                                                                         |
| Mean Strength .. ..                                     | 1,086.                                                                                                                  |                                      | 1,372.                                                                                                                                                 |
| Classes of Disabilities.                                | Invalids<br>sent Home.                                                                                                  | Discharged as<br>Invalids at Netley. | Discharged as<br>Invalids in the<br>Colonies.                                                                                                          |
| I. <i>General Diseases.</i>                             | The diseases from<br>which the 5<br>invalids who<br>were sent home<br>suffered, are<br>not specified in<br>the returns. | 2                                    | The diseases from<br>which the 31<br>men who were<br>invalided in the<br>West Indian<br>Command suf-<br>fered, are not<br>specified in the<br>returns. |
| Constitutional Group ..                                 |                                                                                                                         |                                      |                                                                                                                                                        |
| II. <i>Local Diseases.</i>                              |                                                                                                                         |                                      |                                                                                                                                                        |
| Diseases of the—                                        |                                                                                                                         |                                      |                                                                                                                                                        |
| Digestive System .. ..                                  |                                                                                                                         | 1                                    |                                                                                                                                                        |
| Organs of Locomotion ..                                 |                                                                                                                         | 1                                    |                                                                                                                                                        |
| General Total .. ..                                     | 5                                                                                                                       | 4                                    | 38                                                                                                                                                     |
| Ratio per 1,000 { 1876 ..<br>of Mean Strength { 1866–75 | 4·60<br>28·14                                                                                                           | 3·68<br>12·06                        | 27·70<br>17·25                                                                                                                                         |

*Section III.**Mean Daily Sick.*

The average number of White Soldiers constantly in hospital, was 45 ; the average number of Black Soldiers was 57.

The usual information calculated from these numbers is given in the following Table :—

|                                                    |            | White<br>Troops. | Black<br>Troops. |
|----------------------------------------------------|------------|------------------|------------------|
| Ratio per 1,000 of<br>Strength constantly<br>Sick. | 1876 ..    | 41·44            | 55·88            |
|                                                    | 1866-75 .. | 43·96            | 57·15            |
| Mean Sick time to<br>each Soldier.                 | 1876 ..    | 15·12            | 20·40            |
|                                                    | 1866-75 .. | 16·04            | 20·86            |
| Average duration of<br>each case of Sickness       | 1876 ..    | 19·96            | 17·14            |
|                                                    | 1866-75 .. | 16·07            | 19·72            |

*Section IV.**On the Influence of Age on the Mortality.*

The data for the compilation of this information are not contained in the Monthly Returns.

## VII.—ON THE HEALTH OF THE TROOPS SERVING IN THE WEST AFRICA SETTLEMENTS COMMAND.

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### *Section I.*

#### *Sickness and Mortality.*

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#### STATISTICAL REPORT.

##### 1. WHIT TROOPS.

*West Africa.* THE average annual strength of the European non-commissioned officers serving in the Command was 10; the admissions into hospital amongst them were 18; no death occurred; two staff-serjeants were invalided; the average daily sick was '69.

The admissions were mostly due to paroxysmal fevers.

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##### 2.—BLACK TROOPS.

The Black Troops in the Command consisted of the service companies of the 1st West India Regiment, stationed at Sierra Leone, and at Cape Coast.

The average strength of the Black Troops was 525; the admissions into hospital amongst them were 738; the deaths were 8; the average of constantly sick was 29·48. The rates given by these numbers are, for admissions, 1405·7; for deaths, 15·22; and for constantly sick, 56·15 per 1,000 of the strength respectively. The rate of admissions is one-seventh higher, that of deaths is a fifth lower than the corresponding rate of the preceding year.

For the Sierra Leone station the admission rate is 1545·4 per 1,000 of the strength, and the death-rate is 14·21; for the Cape Coast station the admission rate is 1127·8, and the death-rate 11·63 per 1,000.

The admissions and deaths in each class and order of diseases are shown in the following Table :—

| Orders. | Black Troops.                       | 1876.                  |           |                     |              | 1869-75.            |              |
|---------|-------------------------------------|------------------------|-----------|---------------------|--------------|---------------------|--------------|
|         |                                     | Mean Strength.<br>525. |           | Ratio per<br>1,000. |              | Ratio per<br>1,000. |              |
|         |                                     | Admitted.              | Died.     | Admitted.           | Died.        | Admitted.           | Died.        |
|         | <b>I. General Diseases.</b>         |                        |           |                     |              |                     |              |
| 1       | Febrile Group .. ..                 | 225                    | 1         | 428·6               | 1·90         | 513·7               | 6·11         |
| 2       | Constitutional „ ..                 | 157                    | 4         | 299·0               | 7·62         | 244·3               | 7·12         |
|         | <b>II. Local Diseases.</b>          |                        |           |                     |              |                     |              |
|         | <b>Diseases of the—</b>             |                        |           |                     |              |                     |              |
| 1       | Nervous System .. ..                | 5                      | ..        | 9·5                 | ..           | 16·8                | 2·80         |
| 2       | Eye .. ..                           | 6                      | ..        | 11·4                | ..           | 22·1                | ..           |
| 3       | Ear .. ..                           | 5                      | ..        | 9·5                 | ..           | 2·0                 | ..           |
| 4       | Nose .. ..                          | ..                     | ..        | ..                  | ..           | ·8                  | ..           |
| 5       | Circulatory System ..               | 3                      | 1         | 5·7                 | 1·90         | 7·1                 | 1·02         |
| 6       | Absorbent .. ..                     | 18                     | ..        | 34·3                | ..           | 15·3                | ..           |
| 8       | Respiratory „ ..                    | 25                     | ..        | 47·6                | ..           | 96·4                | 4·33         |
| 9       | Digestive „ ..                      | 72                     | 1         | 137·1               | 1·90         | 211·2               | 9·16         |
| 10      | Urinary „ ..                        | 79                     | 1         | 150·5               | 1·90         | 110·9               | ·76          |
| 11      | Generative „ ..                     | 14                     | ..        | 26·7                | ..           | 24·4                | ..           |
| 12      | Organs of Locomotion ..             | 5                      | ..        | 9·5                 | ..           | 15·0                | ·51          |
| 13      | Cellular Tissue .. ..               | 14                     | ..        | 26·7                | ..           | 48·1                | ·51          |
| 14      | Cutaneous System .. ..              | 69                     | ..        | 131·4               | ..           | 136·4               | ..           |
|         | <b>III. Conditions, &amp;c.</b>     |                        |           |                     |              |                     |              |
|         | Debility .. ..                      | 3                      | ..        | 5·7                 | ..           | 13·0                | ..           |
|         | <b>IV. Poisons</b> .. ..            | 1                      | ..        | 1·9                 | ..           | 1·0                 | ..           |
|         | <b>V. Injuries.</b>                 |                        |           |                     |              |                     |              |
| 1       | Battle .. ..                        | ..                     | ..        | ..                  | ..           | 17·8                | 1·78         |
| 2       | Accidental .. ..                    | 36                     | ..        | 68·7                | ..           | 84·5                | 1·02         |
| 3       | Homicidal .. ..                     | ..                     | ..        | ..                  | ..           | ·3                  | ·25          |
| 4       | Self-inflicted .. ..                | ..                     | ..        | ..                  | ..           | 1·0                 | ..           |
| 5       | Judicial .. ..                      | ..                     | ..        | ..                  | ..           | ·8                  | ..           |
|         | <b>IV. Surgical Operations..</b>    | ..                     | ..        | ..                  | ..           | ·5                  | ..           |
|         | Not stated.. ..                     | ..                     | ..        | ..                  | ..           | 1·3                 | ..           |
|         | No appreciable disease ..           | 1                      | ..        | 1·9                 | ..           | ·3                  | ..           |
|         | <b>Total .. ..</b>                  | <b>738</b>             | <b>8</b>  | <b>1405·7</b>       | <b>15·22</b> | <b>1585·0</b>       | <b>35·37</b> |
|         | <b>Average of 10 years, 1866-75</b> | <b>..</b>              | <b>..</b> | <b>1514·4</b>       | <b>36·44</b> | <b>..</b>           | <b>..</b>    |

GENERAL DISEASES.—The rate of admissions of diseases of the *febrile group* is 149· per 1,000 higher than that of the preceding year, but is 23·9 per 1,000 lower for that of the *constitutional group*.

The admissions and deaths from the principal diseases in this class are shown in the following Table :—

West Africa.

| Black Troops.                    |           |       | Ratio per 1,000 of Mean Strength, 1876. |       |
|----------------------------------|-----------|-------|-----------------------------------------|-------|
| General Diseases.                | Admitted. | Died. | Admitted.                               | Died. |
|                                  |           |       |                                         |       |
| <i>Febrile Group—</i>            |           |       |                                         |       |
| Eruptive Fevers.. .. .           | 1         | ..    | 1.9                                     | ..    |
| Paroxysmal „ .. . . .            | 200       | 1     | 381.0                                   | 1.90  |
| Other diseases .. . . .          | 21        | ..    | 45.7                                    | ..    |
| Total of Febrile Group .. .      | 225       | 1     | 428.6                                   | 1.90  |
| <i>Constitutional Group--</i>    |           |       |                                         |       |
| Rheumatism .. . . .              | 33        | ..    | 62.9                                    | ..    |
| Syphilis .. . . .                | 107       | ..    | 203.8                                   | ..    |
| Scrofula, Phthisis, &c. .. .     | 12        | 4     | 22.9                                    | 7.62  |
| Other diseases .. . . .          | 5         | ..    | 9.5                                     | ..    |
| Total of Constitutional Group .. | 157       | 4     | 299.1                                   | 7.62  |

*Eruptive Fevers.*—One admission (for chicken-pox) is the only illness returned in this group.

*Continued Fevers.*—No admission is returned.

*Paroxysmal Fevers.*—The rate of admissions is 105.1 per 1,000 men higher than that of 1875. Nearly the whole of the admissions in this group took place at Sierra Leone, where the death also happened.

*Other Diseases.*—All the admissions were for mumps, and they are returned exclusively from the Sierra Leone station.

*Rheumatism.*—The rate of admissions is less than the half of that of the preceding year.

*Syphilis.*—The rate of prevalence of this disease exceeds that of 1875 by 55.1 per 1,000 men; only 6 of the admissions took place in the Gold Coast station of the Command.

*Scrofula, Phthisis, &c.*—With a rate of admissions little more than a-half of that of the preceding year, the death-rate is nearly the same.

*Other Diseases.*—All the admissions in this group were on account of general dropsy.

**LOCAL DISEASES.**—Diseases of the *nervous system*, of the *eye*, of the *circulatory*, and *respiratory systems*, are in lower proportions than in 1875, the decrease in the instance of the last-named being 38.5. Diseases of the *digestive*, of the *urinary*, and of the *cutaneous systems*, are all in higher rates than those of last year; in the instance of diseases of the *urinary system*, it amounts to 62.4 per 1,000 men.

**POISONS.**—The admission in this class was due to a snake-bite.

#### Officers.

The average annual strength of the Officers serving in the Command was 33, amongst whom there were 57 attacks of illness and 1 death; most of the former were owing to paroxysmal fevers. The death was that of an officer from the Cape Coast station, and was due to dysentery. Six Officers were invalided during the year—three on account of fevers, ague in one instance, remittent fever in two; one officer was invalided for dysentery, one on account of hypochondriasis, and one on account of debility.



## SANITARY REPORT.

*West Africa.*

Surgeon-Major Fox reports :—"The sanitary state of the barracks, military hospital, and grounds in their immediate vicinity, has been satisfactory during the year. The drainage, from the natural slope of the ground and porous nature of the soil, is sufficient. The barracks for the men would be much improved by having fireplaces or stoves erected in each room; the rooms are very damp during the rains, and the men have no way of drying their clothes.

"The cubic accommodation was not increased, with the exception of two rooms on the basement floor, referred to in my report. The ventilation is ample in all the different buildings. The cooking is not sufficiently varied; soup and boiled meat, supplemented with vegetables, which the men are obliged to purchase themselves, constitute their daily mess. The ovens are unused and useless, not being adapted for the fuel of the country, which is wood.

"The clothing remains the same, and, with the exception of the leggings, appears suitable for the climate of the station and season of the year. The drains around barracks and hospital, &c., that were injured by the heavy rains during the wet season, have all been repaired, and are now in an efficient state."

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# VIII.—ON THE HEALTH OF THE TROOPS SERVING AT THE CAPE OF GOOD HOPE AND ST. HELENA.

## Section I.

### Sickness and Mortality.

#### STATISTICAL REPORT.

*Cape of Good Hope and St. Helena.*

The average annual strength of the force was 2,739 non-commissioned officers and men, of whom 171 were stationed in St. Helena. The admissions into hospital (in both portions of the Command) were 2,095; the deaths, including that of an invalid on the passage home, were 21. The average number constantly sick was 110. The proportions given by these numbers are—for admissions, 76·4·9; for deaths, 7·6·7; and for constantly sick, 40·16 per 1,000 of the mean strength respectively.

The rate of admissions is 10·7 per 1,000 men lower than that of last year, the death rate however is ·37 per 1,000 higher.

For the St. Helena portion of the Command, taken separately, the admission rate is 900·6, and the death rate 5·85 per 1,000 of the mean strength.

The corps of which the force (in the Cape of Good Hope portion of the Command only) consisted, and certain of the most important of their health statistics, are shown separately in the following Table :—

| Corps.                         | Years of Service in the Command. | Average Annual Strength. | Admitted into Hospital. | Died. | Invalided. | Ratio per 1,000 of Strength. |       |            | Stations.                                                                                        |
|--------------------------------|----------------------------------|--------------------------|-------------------------|-------|------------|------------------------------|-------|------------|--------------------------------------------------------------------------------------------------|
|                                |                                  |                          |                         |       |            | Admitted.                    | Died. | Invalided. |                                                                                                  |
| Royal Artillery..              | ..                               | 136                      | 135                     | 1     | 2          | 992·7                        | 7·35  | 14·71      | { Cape Town, Natal, King William's Town.                                                         |
| Royal Engineers ..             | ..                               | 69                       | 35                      | ..    | 2          | 507·3                        | ..    | 28·99      | Ditto                                                                                            |
| 2nd Batt., 3rd Foot*           | ..                               | 64                       | 66                      | ..    | ..         | 1031·2                       | ..    | ..         | Cape Town, East London.                                                                          |
| 1st 13th "                     | 2                                | 847                      | 672                     | 5     | 9          | 793·4                        | 5·88  | 10·68      | Natal.                                                                                           |
| 1st " 24th "                   | 2                                | 820                      | 645                     | 7     | 10         | 786·6                        | 8·54  | 12·20      | { Cape Town, with Detachments at Wynberg and Simon's Town; King William's Town, and East London. |
| 32nd Foot ..                   | 4                                | 583                      | 383                     | 7     | 3          | 657·0                        | 12·01 | 5·15       | { King William's Town, with Detachments at East London, &c.                                      |
| Departmental Corps, Staff, &c. | ..                               | 49                       | 5                       | ..    | ..         | ..                           | ..    | ..         |                                                                                                  |

\* Arrived in the Command in November.

The admissions and deaths, in the various classes and orders of diseases, *Cape of Good Hope and St. Helena.* are shown in the following Table:—

| Order.                  | Diseases.                             | 1876.                 |             |              |        |                 |       | 1869-75.                                  |       |
|-------------------------|---------------------------------------|-----------------------|-------------|--------------|--------|-----------------|-------|-------------------------------------------|-------|
|                         |                                       | Mean Strength, 2,739. |             |              |        |                 |       | Annual Ratio<br>per 1,000<br>of Strength. |       |
|                         |                                       | Admitted.             | Deaths.     |              |        | Ratio per 1,000 |       |                                           |       |
|                         |                                       |                       | In Command. | Of Invalids. | Total. | Admitted.       | Died. |                                           |       |
|                         |                                       | Admitted.             | In Command. | Of Invalids. | Total. | Admitted.       | Died. | Admitted.                                 | Died. |
| I. General Diseases.    |                                       |                       |             |              |        |                 |       |                                           |       |
| 1                       | Febrile Group ..                      | 199                   | 2           | ..           | 2      | 72·6            | ·73   | 100·4                                     | ·70   |
| 2                       | Constitutional „ ..                   | 391                   | 1           | 1            | 2      | 142·8           | ·73   | 187·9                                     | 2·25  |
| II. Local Diseases.     |                                       |                       |             |              |        |                 |       |                                           |       |
| Diseases of the—        |                                       |                       |             |              |        |                 |       |                                           |       |
| 1                       | Nervous system ..                     | 20                    | 1           | ..           | 1      | 7·3             | ·37   | 12·8                                      | 1·32  |
| 2                       | Eye .. ..                             | 100                   | ..          | ..           | ..     | 36·5            | ..    | 40·7                                      | ..    |
| 3                       | Ear .. ..                             | 15                    | ..          | ..           | ..     | 5·5             | ..    | 4·7                                       | ..    |
| 4                       | Nose .. ..                            | 1                     | ..          | ..           | ..     | ·4              | ..    | ·4                                        | ..    |
| 5                       | Circulatory system ..                 | 33                    | 4           | ..           | 4      | 12·4            | 1·46  | 13·1                                      | 1·65  |
| 6                       | Absorbent „ ..                        | 48                    | ..          | ..           | ..     | 17·5            | ..    | 17·4                                      | ..    |
| 8                       | Respiratory „ ..                      | 83                    | 3           | ..           | 3      | 30·3            | 1·09  | 33·2                                      | ·80   |
| 9                       | Digestive „ ..                        | 271                   | 5           | ..           | 5      | 98·9            | 1·82  | 146·8                                     | 1·60  |
| 10                      | Urinary „ ..                          | 223                   | ..          | ..           | ..     | 81·4            | ..    | 158·1                                     | ·10   |
| 11                      | Generative „ ..                       | 16                    | ..          | ..           | ..     | 5·8             | ..    | 14·0                                      | ..    |
| 12                      | Organs of Locomotion ..               | 13                    | ..          | ..           | ..     | 4·7             | ..    | 5·1                                       | ·15   |
| 13                      | Cellular Tissue ..                    | 57                    | ..          | ..           | ..     | 20·8            | ..    | 25·0                                      | ..    |
| 14                      | Cutaneous system ..                   | 201                   | ..          | ..           | ..     | 73·3            | ..    | 83·3                                      | ..    |
| III. Conditions, &c.    |                                       |                       |             |              |        |                 |       |                                           |       |
|                         | Debility .. ..                        | 17                    | ..          | ..           | ..     | 6·2             | ..    | 7·9                                       | ·15   |
|                         | IV. Poisons ..                        | 13                    | 2           | ..           | 2      | 4·7             | ·73   | 7·3                                       | ·35   |
| V. Injuries.            |                                       |                       |             |              |        |                 |       |                                           |       |
| 2                       | Accidental .. ..                      | 389                   | 1           | ..           | 1      | 142·0           | ·37   | 128·4                                     | 1·25  |
| 3                       | Homicidal .. ..                       | ..                    | ..          | ..           | ..     | ..              | ..    | ·2                                        | ·05   |
| 4                       | Self-inflicted .. ..                  | ..                    | 1           | ..           | 1      | ..              | ·37   | ..                                        | ·25   |
| VI. Surgical Operations |                                       |                       |             |              |        |                 |       |                                           |       |
|                         | No appreciable disease ..             | 3                     | ..          | ..           | ..     | 1·1             | ..    | 1·0                                       | ..    |
|                         | Total .. ..                           | 2,095                 | 20          | 1            | 21     | 764·9           | 7·67  | 988·2                                     | 10·62 |
|                         | Average of 10 years,<br>1866-75 .. .. | } ..                  | ..          | ..           | ..     | 1030·3          | 10·74 | ..                                        | ..    |

**GENERAL DISEASES.**—The rate of admissions is lower than that for 1875, by 12·2 per 1,000 men, the whole of the decrease is in the *constitutional* group; in the *febrile* group the rate exceeds that of the preceding year by 17·9 per 1,000.

The admissions and deaths from the principal diseases in the class, are shown in the following Table:—

*Cape of Good  
Hope and St.  
Helena.*

| General Diseases.             | 1876.                 |             |              |        |                 |       | 1869-75.                                  |       |
|-------------------------------|-----------------------|-------------|--------------|--------|-----------------|-------|-------------------------------------------|-------|
|                               | Mean Strength, 2,739. |             |              |        |                 |       | Annual Ratio<br>per 1,000<br>of Strength. |       |
|                               | Admitted.             | Deaths.     |              |        | Ratio per 1,000 |       |                                           |       |
|                               |                       | In Command. | Of Invalids. | Total. | Admitted.       | Died. | Admitted.                                 | Died. |
| <i>Febrile—</i>               |                       |             |              |        |                 |       |                                           |       |
| Eruptive Fevers .. ..         | 1                     | ..          | ..           | ..     | ·4              | ..    | 1·4                                       | ..    |
| Continued „ .. ..             | 140                   | 1           | ..           | 1      | 51·1            | ·37   | 41·6                                      | ·35   |
| Paroxysmal „ .. ..            | 41                    | 1           | ..           | 1      | 14·9            | ·37   | 30·0                                      | ·25   |
| Cholera .. ..                 | ..                    | ..          | ..           | ..     | ..              | ..    | ·1                                        | ..    |
| Influenza .. ..               | 14                    | ..          | ..           | ..     | 5·1             | ..    | 22·6                                      | ..    |
| Erysipelas .. ..              | 2                     | ..          | ..           | ..     | ·7              | ..    | 3·7                                       | ·10   |
| Other diseases .. ..          | 1                     | ..          | ..           | ..     | ·4              | ..    | 1·0                                       | ..    |
| Total of Febrile Group ..     | 199                   | 2           | ..           | 2      | 72·6            | ·74   | 100·4                                     | ·70   |
| <i>Constitutional—</i>        |                       |             |              |        |                 |       |                                           |       |
| Rheumatism .. ..              | 133                   | ..          | ..           | ..     | 48·6            | ..    | 41·6                                      | ·05   |
| Syphilis .. ..                | 243                   | ..          | ..           | ..     | 88·7            | ..    | 135·3                                     | ·20   |
| Scrofula, Phthisis, &c... ..  | 14                    | 1           | 1            | 2      | 5·1             | ·73   | 8·6                                       | 2·00  |
| Scurvy and Purpura .. ..      | 1                     | ..          | ..           | ..     | ·4              | ..    | ·1                                        | ..    |
| Anæmia .. ..                  | ..                    | ..          | ..           | ..     | ..              | ..    | 1·3                                       | ..    |
| Other diseases .. ..          | ..                    | ..          | ..           | ..     | ..              | ..    | 1·0                                       | ..    |
| Total of Constitutional Group | 391                   | 1           | 1            | 2      | 142·8           | ·73   | 187·9                                     | 2·25  |

*Eruptive Fevers.*—Only one admission is returned, it was due to measles.

*Continued Fevers.*—The rate of admissions exceeds that of 1875, by 20·5 per 1,000 men. *Enteric Fever*, caused three admissions; one attack ended fatally.

*Paroxysmal Fevers.*—The rate of prevalence is a little higher than that for the preceding year; of 41 admissions for fevers of this nature 35 were those of men of the 32nd Regiment.

*Erysipelas.*—The rate of prevalence is about one-fifth of that of the preceding year.

*Rheumatism.*—The rate of prevalence is a little lower than in 1875.

*Syphilis.*—There is a decrease of 26·9 per 1,000 on the rate of prevalence of the preceding year.

*Scrofula, Phthisis, &c.*—The prevalence of diseases of this nature is in a little higher rate than in 1875, the rate of mortality is also higher.

**LOCAL DISEASES.** *Diseases of the Eye.*—The rate of admissions exceeds that of the preceding year by 4·0 per 1,000 men; excepting 12, all the admissions in this order were on account of conjunctivitis, a disease of disproportionately frequent occurrence in the 1st Battalion of the 13th Foot; respecting it the medical officer remarks, "The Battalion has suffered a good deal from conjunctivitis of a very intractable form, and hardly amenable to any mode of treatment.....Many (of the men admitted) have been in hospital five and six months, and will require to be invalided."

*Diseases of the Circulatory System.*—The rates of prevalence and of mortality for diseases of this order, are only fractionally different from those of the preceding year; half of the admissions were for palpitation.

*Diseases of the Respiratory System.*—The rate of prevalence exceeds that of the preceding year by 6·6 per 1,000 men, the rate of mortality is about one-third higher.

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*Diseases of the Digestive System.*—The rate of prevalence is 17·1 per 1,000 men lower than that for the preceding year, but the rate of mortality is nearly five times higher; two of the deaths in this order were caused by dysentery, and three by hepatitis. *Cape of Good Hope and St. Helena.*

*Diseases of the Urinary, and of the Cutaneous Systems,* are in higher rates of prevalence than the corresponding ones for 1875.

*CONDITIONS, &c.—Debility.*—The rate of admissions for this affection is little more than the half of that for the preceding year.

*INJURIES.—Accidental.*—The rate of admissions is only fractionally different from that of 1875, but the rate of mortality is 1·08 per 1,000 men lower, the death was due to drowning. *Self-inflicted.*—The death in this order was by gunshot.

#### *Officers.*

The average annual strength of the officers serving in the Command was 92; amongst whom there were 54 attacks of illness and 2 deaths: being in the rates of 587·0 and of 21·74 per 1,000 of the strength respectively. Both of the deaths were from consumption.

#### *Women.*

The annual average strength of the wives of the non-commissioned officers and men was 201, amongst them there were 132 attacks of illness and 6 deaths (in the Command), being in the annual rates of 656·7 and of 29·85 per 1,000 of the strength respectively; twelve attacks of illness were of dysentery. The deaths were caused by consumption (3), dysentery (1), cancer (1), and 1 was due to the puerperal state.

#### *Children.*

In a strength of 414 children of non-commissioned officers and men, there were 242 attacks of illness and 12 deaths, being in the proportions of 584·5, and of 28·99 per 1,000 of the strength respectively. In point of numbers the more important illnesses were whooping-cough, conjunctivitis, bronchitis, and diarrhoea. The deaths were due to diphtheria (1), convulsions (3), diarrhoea (5), enteritis (1), debility (1), and suffocation (1).

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#### SANITARY REPORT.

Deputy Surgeon-General Woolfreys reports:—"The sanitary state of the several garrisons in the Command during the year 1876 has been satisfactory; the general health of the troops has been good, and there have been no causes of disease particularly affecting health reported by any medical officers. Sanitary defects of urgency, or those not requiring large outlays of public money have been remedied at once; whilst those of no immediate importance have been noted in the annual estimates. *Cape of Good Hope.*

"The prevailing diseases have been, as usual, venereal affections, causing nearly one-fourth of the total admissions during the year. No epidemic has occurred amongst the troops, notwithstanding that influenza and cerebro-spinal meningitis have been prevalent amongst the civil population throughout the colony.

"*Cape Town.*—The Castle Ditch is occupied by one of the principal sewers of the town. It is formed by the junction of three tributary sewers in the Sir Lowry Road, runs as an open sewer along the eastern ditch and empties itself on the beach. Owing to the shifting nature of the sand, especially in summer, when there are no storms and floods to wash it away, it collects and forms an embankment, so that the sewage cannot escape into the sea, and is therefore scattered all over the foreshore. Again, owing to the breakwater or some other obstruction in the harbour, the sewage of the town cannot escape out to sea, but at certain states of the tide is thrown back upon the beach at the same spot under the Inghoff Battery. In fact, the sea beach from the Castle to the Hospital is all in a more or less polluted state during the summer months. Representations have been repeatedly made to the municipal authorities but to no purpose, as a very large outlay of money would be

*Cape of Good Hope.* required to remedy the evil. The Royal Engineers made an effort to discharge the sewage from the Castle Ditch directly into the sea by laying down wooden troughs to low water mark, but these were carried away, and there is therefore no hope of any permanent good resulting without the co-operation of the town authorities. There is another nuisance in the vicinity of the Castle and Government buildings, viz., the scavenging of the town is brought to a tipping platform situated near, and the exhalations from the trucks are sometimes sickening. This evil is however, I am assured, occupying the attention of the Town Council, and will soon be remedied.

"The Station Hospital main drain, during the prevalence of north-westerly winds or certain states of the tide, sometimes becomes choked at its entrance into the sea with sand.

"*Eastern Frontiers.*—The married soldiers' quarters, for the most part consisting of wattle and daub huts, are badly constructed, in a bad state of repair, damp and ill-ventilated, and unfit for occupation. It is useless to attempt to renovate them. The hospital, too, is small, does not afford sufficient accommodation for the sick of the garrison, and has to be supplemented by marquees. Altogether, the building is objectionable for a hospital. The infant school, tailors' and shoemakers' shops are too small, not giving sufficient cubic space to the occupants.

"*Natal.*—There is a great want of barrack accommodation for the troops, more especially now that an additional regiment has been sent into the Command. The kraal huts that have been erected, to the number of 90, leak during the heavy rains. The married soldiers' quarters, consisting of huts erected by the previous regiments, are for the most part badly constructed, too small, and ill-ventilated. The hospital is bad, too small, and roof-eaten by white ants.

The Sanitary Improvements required :—

"*Cape Town.*—The sewer in Castle Ditch should be covered over. A sea wall should be built by the municipal authorities in front of the Imhoff Battery, and for some distance eastward along the shore, to prevent the sewage from being thrown back upon it. Some plan should be devised to prevent the choking of the drain at Station Hospital.

"*King William's Town.*—New married soldiers' quarters required; also another hospital, infant school, tailors' and shoemakers' shops. Day urinals for barracks are much needed.

"*Natal.*—More barrack accommodation required; new married quarters and hospital.

"Numerous sanitary improvements have been made during the year, but chiefly of a minor character."

#### SANITARY REPORT.

*St. Helena.*

Surgeon-Major Herbert, the senior medical officer, reports that there has been a great change at this station during the year. "James's Town, in which is situate the infantry barracks, now almost empty, except for the occupation of a few married families of soldiers, contains the hospital, military prison, and government offices; it is placed in a valley between two high rocky ranges of hills opening out at the head of the valley to the influence of the trade winds,—which probably prevents the outbreak of disease, as the climate here is hot and enervating, and most depressing to those exposed to its influence. On the other hand, Ladder Hill, where the main body of the troops is stationed, is much healthier, being more than 600 feet above the sea level, but it is hot and relaxing during the day from direct solar and radiated rock heat. The nights are cool, except during the very height of summer, which gives it a great superiority over James's Town. High Knoll, which contains the next largest body of troops is very cool and healthy, being about 2,000 feet above the sea level and well exposed to the air and winds from every quarter.

"The general health of the troops throughout the year has been satisfactory."

## Section II.

*On the Extent of Invaliding.**Capt. of Good  
Hope and St.  
Helena.*

Twenty-eight invalids were sent home from the Command (26 from the Cape and 2 from St. Helena) and 25 were discharged the service at Netley during the year, being in the rates of 10·22, and of 9·13 per 1,000 men respectively.

The classes and orders of the diseases which necessitated the invaliding of the year are shown in the following Table :—

| Disabilities.                     | Invalids<br>sent to<br>England<br>from the Cape<br>and<br>St. Helena. | Invalids<br>Discharged<br>the Service<br>at Netley,<br>and else-<br>where. |
|-----------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------|
| <b>I. General Diseases.</b>       |                                                                       |                                                                            |
| Constitutional Group .. .. .      | 9                                                                     | 6                                                                          |
| <b>II. Local Diseases.</b>        |                                                                       |                                                                            |
| Diseases of the—                  |                                                                       |                                                                            |
| Nervous System .. .. .            | 2                                                                     | 1                                                                          |
| Eye .. .. .                       | 3                                                                     | 3                                                                          |
| Ear .. .. .                       | 2                                                                     | 2                                                                          |
| Circulatory System .. .. .        | 6                                                                     | 6                                                                          |
| Digestive „ .. .. .               | 1                                                                     | 1                                                                          |
| Organs of Locomotion .. .. .      | 2                                                                     | 1                                                                          |
| <b>V. Injuries.</b>               |                                                                       |                                                                            |
| Accidental.. .. .                 | 3                                                                     | 5                                                                          |
| <b>Total .. .. .</b>              | <b>28</b>                                                             | <b>25</b>                                                                  |
| Ratio per 1,000 of Mean { 1876 .. | 10·22                                                                 | 9·13                                                                       |
| Strength.. .. { 1866-75 ..        | 25·85                                                                 | 18·64                                                                      |

The rate of primary invaliding is lower by 2·54 per 1,000 men than that of 1875; the rate of final invaliding is 2·56 per 1,000 higher.

## Section III.

*Mean Daily Sick.*

The average number constantly sick in the Command was 110, being in the proportion of 40·16 per 1,000 of the strength, showing an increase of 2·48 per 1,000 on the rate of the preceding year.

The usual information calculated from this number is given in the following Table :—

|                                                    | 1876. | 1866-75. |
|----------------------------------------------------|-------|----------|
| Ratio per 1,000 of Strength constantly Sick.. .. . | 40·16 | 49·63    |
|                                                    | days. | days.    |
| Average Sick time to each Soldier .. .. .          | 14·66 | 18·12    |
| Average duration of each case of Sickness .. .. .  | 19·16 | 17·59    |

## Section IV.

*Cape of Good  
Hope and St.  
Helena.*

*Influence of Age on Mortality.*

| Corps.                        | Under 20. |       | 20 and under 25. |       | 25 and under 30. |       | 30 and under 35. |       | 35 and under 40. |       | 40 and upwards. |       |
|-------------------------------|-----------|-------|------------------|-------|------------------|-------|------------------|-------|------------------|-------|-----------------|-------|
|                               | Strength. | Died. | Strength.        | Died. | Strength.        | Died. | Strength.        | Died. | Strength.        | Died. | Strength.       | Died. |
| Royal Artillery ... ..        | 8         | ...   | 43               | ...   | 35               | ...   | 19               | ...   | 18               | ...   | 8               | ...   |
| Royal Engineers... ..         | 2         | ...   | 13               | ...   | 26               | ...   | 14               | ...   | 5                | ...   | 7               | ...   |
| 1st Battalion, 18th Foot ...  | 97        | 1     | 302              | ...   | 218              | 1     | 123              | 2     | 80               | 1     | 14              | ...   |
| " " 24th " ... ..             | 43        | ...   | 429              | 2     | 197              | 2     | 115              | ...   | 72               | 3     | 11              | ...   |
| 32nd Foot... ..               | 22        | ...   | 167              | 2     | 147              | 3     | 124              | 2     | 84               | ...   | 24              | ...   |
| Total ... ..                  | 172       | 1     | 954              | 4     | 623              | 6     | 395              | 4     | 259              | 4     | 64              | ...   |
| Ratio per 1,000 of { 1876 ... | 5·81      |       | 4·19             |       | 9·63             |       | 10·13            |       | 15·44            |       | ...             |       |
| Mean Strength..... { 1866-75  | 1·52      |       | 5·65             |       | 10·07            |       | 14·38            |       | 23·61            |       | 20·80           |       |



# **IX.--ON THE HEALTH OF THE TROOPS SERVING IN THE ISLAND OF MAURITIUS.**

## *Section I.*

### *Sickness and Mortality.*

#### **STATISTICAL REPORT.**

THE average annual strength of the force was 440 non-commissioned officers and men, amongst whom there were 712 admissions into hospital and 3 deaths; the average number of constantly sick was 16.62. The ratios given by these numbers are—for admissions, 1618.2; for deaths, 6.81; and for constantly sick, 37.77 per 1,000 of the mean strength, respectively. The rate of admissions exceeds that of the preceding year by 295.3 per 1,000 men; the death-rate, however, is 7.65; that of constantly sick is 3.15 per 1,000 men lower than in 1875. *Mauritius.*

The corps of which the force consisted, and some of the more important of their health statistics, are shown in the following Table :—

| Corps.                                                                        | Average Annual Strength. | Admitted into Hospital. | Died. | Invalided. | Average Daily Sick. | Ratio per 1,000 of the strength. |       |            | Average Daily Sick. | Average Sick-time to each Soldier. | Average duration of each case of Sickness. |
|-------------------------------------------------------------------------------|--------------------------|-------------------------|-------|------------|---------------------|----------------------------------|-------|------------|---------------------|------------------------------------|--------------------------------------------|
|                                                                               |                          |                         |       |            |                     | Admitted.                        | Died. | Invalided. |                     |                                    |                                            |
| Royal Artillery, 4th Battery 2nd Brigade, and 3rd Battery 22nd Brigade ... .. | 91                       | 149                     | 1     | 1          | 3.28                | 1637.3                           | 10.88 | 10.88      | 36.04               | 13.16                              | 8.64                                       |
| 2nd Bat. 3rd Foot, Wing *                                                     | 161                      | 288                     | ...   | ...        | 6.24                | 1788.8                           | ...   | ...        | 35.76               | 14.15                              | 7.91                                       |
| 2nd Foot †                                                                    | 167                      | 257                     | 1     | 6          | 6.72                | 1538.9                           | 5.99  | 35.93      | 40.28               | 14.69                              | 9.54                                       |
| Departmental Corps, &c....                                                    | 21                       | 18                      | 1     | 2          | .38                 | ...                              | ...   | ...        | ...                 | ...                                | ...                                        |

\* Arrived in the Command in July.

† Left the Command in July.

The admissions and deaths in the various classes and orders of diseases are shown in the following Table :—

*Mauritius.*

| Order. | Diseases.                          | 1876.          |       |                  |       | 1869-75.         |       |
|--------|------------------------------------|----------------|-------|------------------|-------|------------------|-------|
|        |                                    | Strength, 440. |       |                  |       | Ratio per 1,000. |       |
|        |                                    | Admitted.      | Died. | Ratio per 1,000. |       | Admitted.        | Died. |
|        |                                    |                |       | At Mauritius.    |       |                  |       |
|        | I. General Diseases.               |                |       |                  |       |                  |       |
| 1      | Febrile Group ..                   | 302            | 1     | 686·4            | 2·27  | 780·8            | 2·88  |
| 2      | Constitutional „ ..                | 46             | ..    | 104·5            | ..    | 107·1            | 2·88  |
|        | II. Local Diseases.                |                |       |                  |       |                  |       |
|        | Diseases of the—                   |                |       |                  |       |                  |       |
| 1      | Nervous System ..                  | 10             | ..    | 22·7             | ..    | 9·5              | 1·15  |
| 2      | Eye .. ..                          | 14             | ..    | 31·8             | ..    | 11·2             | ..    |
| 3      | Ear .. ..                          | 1              | ..    | 2·3              | ..    | 8·7              | ..    |
| 5      | Circulatory System ..              | 8              | ..    | 18·2             | ..    | 12·1             | 2·02  |
| 6      | Absorbent „ ..                     | 15             | ..    | 34·1             | ..    | 11·2             | ..    |
| 7      | Ductless Glands ..                 | 2              | ..    | 4·5              | ..    | ..               | ..    |
| 8      | Respiratory System ..              | 37             | 1     | 84·1             | 2·27  | 32·8             | ·58   |
| 9      | Digestive „ ..                     | 164            | 1     | 236·4            | 2·27  | 197·0            | 4·03  |
| 10     | Urinary „ ..                       | 28             | ..    | 63·6             | ..    | 52·7             | ..    |
| 11     | Generative „ ..                    | 1              | ..    | 2·3              | ..    | 12·1             | ..    |
| 12     | Organs of Locomotion ..            | 4              | ..    | 9·1              | ..    | 5·0              | ..    |
| 13     | Cellular Tissue ..                 | 20             | ..    | 45·4             | ..    | 22·8             | ..    |
| 14     | Cutaneous System ..                | 39             | ..    | 88·6             | ..    | 61·9             | ..    |
|        | III. Conditions, &c.               |                |       |                  |       |                  |       |
|        | Debility .. ..                     | 4              | ..    | 9·1              | ..    | 6·9              | ..    |
|        | IV. Poisons ..                     | 7              | ..    | 15·9             | ..    | 22·8             | 1·15  |
|        | V. Injuries.                       |                |       |                  |       |                  |       |
| 2      | Accidental .. ..                   | 70             | ..    | 159·2            | ..    | 102·8            | ·58   |
| 4      | Self-inflicted .. ..               | ..             | ..    | ..               | ..    | ..               | ·28   |
|        | VI. Surgical Operations            | ..             | ..    | ..               | ..    | ·3               | ..    |
|        | Total .. ..                        | 712            | 3     | 1618·2           | 6·81  | 1457·7           | 15·56 |
|        | Average of 10 years, 1866-75 .. .. | } ..           | ..    | 1573·9           | 21·86 | ..               | ..    |

GENERAL DISEASES.—The rate of admissions for diseases of this class is higher than in 1875, and it is higher for each group of the class; the rate of the *febrile* group being 64·7, and that of the *constitutional* 32·2 per 1,000 men in excess of the corresponding rate for the preceding year.

The admissions and deaths from the principal diseases in this class are shown in the following Table :—

*Mauritius.*

| General Diseases.             | Strength, 440. |       | Annual Ratio per 1,000 of Strength. |       |           |       |
|-------------------------------|----------------|-------|-------------------------------------|-------|-----------|-------|
|                               | Admitted.      | Died. | 1876.                               |       | 1869-75.  |       |
|                               |                |       | Admitted.                           | Died. | Admitted. | Died. |
| <i>Febrile—</i>               |                |       |                                     |       |           |       |
| Eruptive Fevers .. ..         | ..             | ..    | ..                                  | ..    | 9         | ..    |
| Continued „ .. ..             | 21             | ..    | 47·7                                | ..    | 65·9      | ..    |
| Paroxysmal „ .. ..            | 246            | 1     | 559·1                               | 2·27  | 705·9     | 2·59  |
| Influenza .. ..               | 34             | ..    | 77·3                                | ..    | 6·6       | ..    |
| Erysipelas .. ..              | 1              | ..    | 2·3                                 | ..    | ·9        | ..    |
| Other diseases .. ..          | ..             | ..    | ..                                  | ..    | ·6        | ·29   |
| Total of Febrile Group ..     | 302            | 1     | 686·4                               | 2·27  | 780·8     | 2·88  |
| <i>Constitutional—</i>        |                |       |                                     |       |           |       |
| Rheumatism .. ..              | 11             | ..    | 25·0                                | ..    | 36·8      | ..    |
| Syphilis .. ..                | 23             | ..    | 63·6                                | ..    | 48·9      | ..    |
| Scrofula, Phthisis, &c... ..  | 3              | ..    | 6·8                                 | ..    | 8·7       | 2·59  |
| Scurvy and Purpura .. ..      | ..             | ..    | ..                                  | ..    | ·3        | ..    |
| Anæmia .. ..                  | 3              | ..    | 6·8                                 | ..    | 12·1      | ·29   |
| Other diseases .. ..          | 1              | ..    | 2·3                                 | ..    | ·3        | ..    |
| Total of Constitutional Group | 46             | ..    | 104·5                               | ..    | 107·1     | 2·88  |

*Continued Fevers.*—The rate of admissions is more than twice that of the preceding year.

*Paroxysmal Fevers.*—The rate of admissions is 26·4 per 1,000 men lower than that of the preceding year, being almost exactly the reduction in the proportion of continued fevers in the present year; this result, taken in connection with the remarks of the Principal Medical Officer, that certain of the cases of malarial fever were not distinctly marked, and might have been returned under other heads, makes it probable that the proportions of the two kinds of fever did not materially differ for the two years. The admissions for paroxysmal fevers (ague in all but two instances) were proportionately three-fold more numerous amongst the men who had served long at the station than amongst those of the corps which arrived about the middle of the year. One death was due to remittent fever.

*Syphilis.*—The rate of admissions is double that of the preceding year.

*LOCAL DISEASES.*—With the exception of diseases of the *ear*, and of the *circulatory, generative, and locomotive systems*, the rate of admission for every order in this class exceeds that for the same order in 1875, and in most instances considerably.

*POISONS.*—The rate of admissions is less than a third of that of the preceding year.

*INJURIES.—Accidental.*—The rate of admissions exceeds that of 1875 by 36·3 per 1,000 men.

#### *Officers.*

In an annual average strength of 22 officers, there were only 6 attacks of illness, none of which were fatal.

#### *Women.*

In an average annual strength of 36 wives of non-commissioned officers and men, there were 9 attacks of illness, and 1 death which was due to dysentery.

#### *Children.*

In an annual average strength of 77 children of non-commissioned officers and men, there were 19 attacks of illness, two-thirds of which were of ague; there were three deaths, due to ague, remittent fever, and anæmia.

## SANITARY REPORT.

Surgeon-Major Moorhead, the senior medical officer, reports :—"It will be seen, on referring to the return showing the specific diseases by which the admissions into hospital and deaths have been occasioned among the troops serving in the Mauritius during the past year, that by far the greatest amount of sickness was due to malarious fever, which is now unfortunately endemic in the island, especially at all districts bordering on the coast line.

"*Prevalence of Fever.*—The greater or less prevalence of the fever here seems to be mainly influenced by climatic causes ; heavy rains inducing a great increase, a drought almost conferring an immunity, not only from fever but all other diseases of malarial origin.

"*Sanitary Condition of Barracks, &c.*—The general sanitary condition of all the occupied barracks in the Command has been reported good by the respective medical officers in charge ; and no great sanitary defects have been noted as existing in the vicinity of any of the barracks.

"*Water Supply.*—The medical officer in charge of the station hospital at Mahebourg attributes the numerous admissions from diarrhoea, which occurred there during the month of August, to the probable pollution of the drinking water. The canal which conveys the water supply to the troops at Mahebourg is no doubt liable to many sources of pollution during the rainy season, and its defects have been frequently pointed out by Deputy Surgeon-General Small in his sanitary reports. A scheme for supplying the troops and people at Mahebourg with water from the Creole river has long been in contemplation by the General Board of Health ; the necessary pipes have long been procured, but want of funds, I believe, stands in the way of its completion. However, a new filtering chamber, in connection with the tank from which the barrack and hospital supply of water is derived, has been recently built, and will no doubt prove highly beneficial.

"*Sanitary Improvements.*—The following are the leading sanitary improvements effected during the year :—

"*Mahebourg.*—Additional ventilation has been provided in the upper floor of the wooden barrack by means of four end ventilating windows. Additional latrine accommodation for the men has been secured ; a house furnished with six tubs has been erected. The drainage of the barracks and hospital has been improved, the old drains have been taken up and relaid in stonework, and a new drain opened. A filtering chamber has been built, and two sheds for the men on sentry have been erected.

"*Fort George.*—A new latrine for officers has been built, the whole range of barracks painted externally, and the ditches thoroughly cleaned out.

"*Sanitary Works.*—The sanitary works under the superintendence of the General Board of Health, in connection with the 'Mer Rouge' in the vicinity of Fort George, are still progressing, and much has been done during the year towards planting the land reclaimed from the foreshores and creeks.

"*Station Hospital, Port Louis.*—The drainage has been improved.

"*Citadel.*—A shed erected for the men on sentry.

"*Additional Huts at Curepipe.*—The erection of a few additional huts at Curepipe is much to be desired. At present there are five huts at the Sanitarium, each capable of accommodating eight men. Of these, four are available, and one not, in consequence of its being used as a commissariat store. This amount of accommodation I consider is not sufficient for the number of men, for whom a change of climate during the hot and sickly season is necessary.

"The Sanitarium has now been occupied to a greater or less extent since January 1873, and with most beneficial results. With a few additional huts and judicious interchanges, the majority of the troops in the Command could have the benefit of a change of climate, their health and efficiency would be restored, and the amount of invaliding probably lessened. This limited hut accommodation at Curepipe is, I consider, the great sanitary want at present, and one deserving attention and consideration."

## Section II.

*Mauritius.**On the Extent of Invaliding.*

Nine invalids were sent home from the Command, and eight were finally discharged the service at Netley during the year. The proportion of men sent home is less than the half of that for the preceding year, but the circumstance of nearly the whole of the troops in the Command having been relieved during the year, may have influenced the result.

| Class. | Order. | Diseases.                                          | Invalids sent Home. | Discharged the Service at Netley. |
|--------|--------|----------------------------------------------------|---------------------|-----------------------------------|
| I.     | 2      | Constitutional group ..                            | 2                   | 2                                 |
| II.    | 1      | Nervous system .. ..                               | 1                   | 1                                 |
|        | 5      | Circulatory „ .. ..                                | 3                   | 3                                 |
|        | 8      | Respiratory „ .. ..                                | 1                   | 1                                 |
|        | 10     | Urinary „ .. ..                                    | 1                   | 1                                 |
|        | 14     | Cutaneous „ .. ..                                  | 1                   | ..                                |
| III.   | ..     | Debility .. ..                                     | 2                   | ..                                |
|        |        | Total .. ..                                        | 9                   | 8                                 |
|        |        | Ratio per 1,000 { 1876 ..<br>of Strength { 1866-75 | 20·45<br>43·48      | 18·18<br>13·86                    |

## Section III.

*Mean Daily Sick.*

The average number of men constantly sick was 16·62.

The usual information, calculated from the number of constantly sick, is given in the following Table :—

|                                                   | 1876. | 1869-75. |
|---------------------------------------------------|-------|----------|
| Ratio per 1,000 of Strength constantly Sick .. .. | 37·77 | 56·58    |
| Mean Sick-Time to each Soldier .. ..              | 13·79 | 20·65    |
| Average duration of cases of Sickness .. ..       | 8·52  | 13·12    |

All the proportions are lower than the corresponding ones for the preceding year, showing that although the number of men admitted into hospital was considerably greater than in 1875, the illnesses were of a less severe nature.

## Section IV.

*Influence of Age on the Mortality.*

In consequence of the change in the composition of the force, no non-commissioned officers or men served for a whole year in the Command.

## X—ON THE HEALTH OF THE TROOPS SERVING IN THE ISLAND OF CEYLON.

### Section I.

#### *Sickness and Mortality.*

*Ceylon.*

THE average annual strength of the non-commissioned officers and men of the White Troops stationed in the Command was 1,076, among them there were 795 admissions into hospital, and 8 deaths; the number constantly sick was 54·98; the rate of admissions is therefore 738·8, that of deaths is 7·43, and that of constantly sick is 51·10 per 1,000 of the average strength respectively. The rate of admissions is 8·5 per 1,000 higher, but that of deaths is 6·13 lower, than the corresponding rate of the preceding year, that of constantly sick is 4·99 per 1,000 higher.

The corps which composed the force stationed in the Command, and certain of the most important of their health statistics, are shown in the following Table:—

| Corps.                                                       | Completed Years of Service in Command. | Average Annual Strength. | Admitted into Hospital. |       |            |       | Average Daily Sick. | Ratio per 1,000 of Strength. |       |            |             | Average Sick-time to each Soldier. |             | Average Duration of each Case of Sickness. | Stations.                            |
|--------------------------------------------------------------|----------------------------------------|--------------------------|-------------------------|-------|------------|-------|---------------------|------------------------------|-------|------------|-------------|------------------------------------|-------------|--------------------------------------------|--------------------------------------|
|                                                              |                                        |                          | Admitted.               | Died. | Invalided. |       |                     | Admitted.                    | Died. | Invalided. | Daily Sick. |                                    |             |                                            |                                      |
| Royal Artillery.<br>6th and 7th Batteries,<br>2nd Brigade. } | 12                                     | 190                      | 123                     | 4     | 1          | 7·21  | 647·0               | 21·00                        | 5·26  | 37·95      |             | Days. 13·85                        | Days. 21·41 |                                            | { Colombo.<br>Galle.<br>Trincomalee. |
| 57th Regiment ...                                            | 2                                      | 863                      | 660                     | 4     | 27         | 46·72 | 764·8               | 4·63                         | 31·29 | 54·14      | 19·76       | 25·84                              |             |                                            | { Colombo.<br>Galle.<br>Kandy.       |
| Departmental Corps, &c.                                      | ...                                    | 23                       | 12                      | .     | .          | 96    | 521·7               | ...                          | ...   | 41·74      | 15·23       | 29·20                              |             |                                            |                                      |

The admissions and deaths in the various orders of diseases, are shown in *Ceylon*. the following Table :—

| Orders. | White Troops ..                       | Strength, 1,076. |            | Annual Ratio per 1,000. |       |           |       |
|---------|---------------------------------------|------------------|------------|-------------------------|-------|-----------|-------|
|         | Diseases.                             | Admitted.        | Died.      | 1876.                   |       | 1869-75.  |       |
|         |                                       |                  | At Ceylon. | Admitted.               | Died. | Admitted. | Died. |
|         | <b>I. General Diseases.</b>           |                  |            |                         |       |           |       |
| 1       | Febrile Group ..                      | 104              | 1          | 96·7                    | ·93   | 175·9     | 2·72  |
| 2       | Constitutional „ ..                   | 63               | 1          | 58·5                    | ·93   | 129·6     | 2·89  |
|         | <b>II. Local Diseases.</b>            |                  |            |                         |       |           |       |
|         | Diseases of the—                      |                  |            |                         |       |           |       |
| 1       | Nervous System ..                     | 11               | 4          | 10·2                    | 3·71  | 13·2      | 1·02  |
| 2       | Eye .. ..                             | 58               | ..         | 53·9                    | ..    | 38·1      | ..    |
| 3       | Ear .. ..                             | 12               | ..         | 11·2                    | ..    | 11·4      | ..    |
| 4       | Nose .. ..                            | ..               | ..         | ..                      | ..    | ·2        | ..    |
| 5       | Circulatory System ..                 | 19               | ..         | 17·7                    | ..    | 18·7      | 2·21  |
| 6       | Absorbent „ ..                        | 32               | ..         | 29·7                    | ..    | 39·1      | ..    |
| 8       | Respiratory „ ..                      | 13               | ..         | 12·1                    | ..    | 39·3      | ·51   |
| 9       | Digestive „ ..                        | 157              | 2          | 145·9                   | 1·86  | 307·4     | 7·30  |
| 10      | Urinary „ ..                          | 66               | ..         | 61·3                    | ..    | 94·5      | ·51   |
| 11      | Generative „ ..                       | 29               | ..         | 26·9                    | ..    | 28·7      | ..    |
| 12      | Organs of Locomotion                  | 8                | ..         | 7·4                     | ..    | 5·0       | ..    |
| 13      | Cellular Tissue ..                    | 12               | ..         | 11·2                    | ..    | 32·4      | ..    |
| 14      | Cutaneous System ..                   | 84               | ..         | 78·1                    | ..    | 118·4     | ·17   |
|         | <b>III. Conditions, &amp;c.</b>       |                  |            |                         |       |           |       |
|         | Debility .. ..                        | 24               | ..         | 22·3                    | ..    | 14·0      | ..    |
|         | <b>IV. Poisons</b> ..                 |                  |            |                         |       |           |       |
|         |                                       | 9                | ..         | 8·4                     | ..    | 18·7      | ·51   |
|         | <b>V. Injuries.</b>                   |                  |            |                         |       |           |       |
| 2       | Accidental .. ..                      | 93               | ..         | 86·4                    | ..    | 138·1     | 1·53  |
| 4       | Self-inflicted .. ..                  | ..               | ..         | ..                      | ..    | ·2        | ·34   |
|         | <b>VI. Surgical Operations</b>        |                  |            |                         |       |           |       |
|         |                                       | ..               | ..         | ..                      | ..    | ·2        | ..    |
|         | No appreciable disease                | 1                | ..         | ·9                      | ..    | 1·9       | ..    |
|         | Total .. ..                           | 795              | 8          | 738·8                   | 7·43  | 1225·0    | 19·71 |
|         | Average of 10 years,<br>1866-75 .. .. | } ..             | ..         | 1094·8                  | 17·63 | ..        | ..    |

**GENERAL DISEASES.**—The rate of admissions for diseases of this class exceeds that of 1875 by 21·6 per 1,000 men. An increased prevalence is found both in diseases of the *febrile* and in that of the *constitutional group*; the rate of mortality for the class is fractionally lower.

The admissions and deaths from the principal diseases in this class are shown in the following Table :—

Ceylon.

| General Diseases.             | 1876.                |                           |                  |       | 1869-75.                            |       |
|-------------------------------|----------------------|---------------------------|------------------|-------|-------------------------------------|-------|
|                               | Mean Strength, 1076. |                           |                  |       | Annual Ratio per 1,000 of Strength. |       |
|                               | Admitted.            | Deaths<br>In Com-<br>mand | Ratio per 1,000. |       | Admitted.                           | Died. |
|                               |                      |                           | Admitted.        | Died. |                                     |       |
| <i>Febrile—</i>               |                      |                           |                  |       |                                     |       |
| Eruptive Fevers .. ..         | 1                    | ..                        | 9                | ..    | 4                                   | ..    |
| Continued „ .. ..             | 95                   | 1                         | 88.3             | .93   | 66.8                                | 1.02  |
| Paroxysmal „ .. ..            | 7                    | ..                        | 6.5              | ..    | 99.4                                | 1.36  |
| Cholera .. ..                 | ..                   | ..                        | ..               | ..    | .5                                  | .17   |
| Influenza .. ..               | ..                   | ..                        | ..               | ..    | 6.6                                 | ..    |
| Erysipelas .. ..              | 1                    | ..                        | .9               | ..    | 1.5                                 | ..    |
| Other diseases .. ..          | ..                   | ..                        | ..               | ..    | .7                                  | .17   |
| Total of Febrile Group ..     | 104                  | 1                         | 96.6             | .93   | 175.9                               | 2.72  |
| <i>Constitutional—</i>        |                      |                           |                  |       |                                     |       |
| Rheumatism .. ..              | 6                    | ..                        | 5.6              | ..    | 28.0                                | ..    |
| Syphilis .. ..                | 49                   | ..                        | 45.5             | ..    | 78.3                                | .17   |
| Scrofula, Phthisis, &c. ..    | 8                    | 1                         | 7.4              | .93   | 11.5                                | 2.38  |
| Scurvy and Purpura .. ..      | ..                   | ..                        | ..               | ..    | .9                                  | ..    |
| Anæmia .. ..                  | ..                   | ..                        | ..               | ..    | 9.0                                 | ..    |
| Other diseases .. ..          | ..                   | ..                        | ..               | ..    | 1.9                                 | .34   |
| Total of Constitutional Group | 63                   | 1                         | 58.5             | .93   | 129.6                               | 2.89  |

*Eruptive Fevers.*—The admission was for chicken-pox.

*Continued Fevers.*—The prevalence of fevers of this kind is in the rate of 9.9 per 1,000 men higher, than that of the preceding year.

*Enteric Fever.*—An attack of this disease proved fatal to a soldier of the 57th Regiment, at Galle.

*Simple Continued Fever,* caused 84 admissions, of which 74 were those of men of the 57th, nearly three-fourths of them being in the head-quarters of the regiment at Colombo.

*Febricula,* caused 10 admissions.

*Paroxysmal Fevers.*—The rate of admissions is 4.1 per 1,000 lower than that of the preceding year; the rate of prevalence of fevers of malarial origin is less than one-sixteenth of the average of ten years, a circumstance which raises the presumption that the influence of diagnosis may be traced in the result.

*Rheumatism.*—The rate of admissions is only one-third of that of the preceding year.

*Syphilis.*—The rate of admissions is double that of 1875.

*Scrofula, Phthisis, &c.*—The rate of admissions is higher than in 1875, but for that year it was exceptionally low.

**LOCAL DISEASES.**—*Diseases of the Nervous System.*—The prevalence of diseases in this order was less than in the preceding year, but the fatality from them was greater; as in 1875 there was a disproportionate number of admissions for mental diseases. Sunstroke, caused two admissions and two deaths, both of the latter were those of men of the Royal Artillery, stationed at Trincomalee, they took place in April. Tetanus caused one admission, the illness followed a slight wound of the foot, and it proved fatal. One death is returned as due to acute mania.

*Diseases of the Eye.*—The rate of admissions is 15.2 per 1,000 men in excess of the high rate of the preceding year. All the admissions in this order were those of men of the 57th Regiment, and excepting four, returned as admissions for impaired vision, all were due to conjunctivitis. The Medical



Officer states that since the arrival of the corps in the Command, this disease has become increasingly prevalent, the admissions in some instances being due to a granular condition of the eyelids following the primary attack. He attributes the origin of the disease to heat and glare, but if this were the usual cause it should seem that the men of other corps stationed in the same places ought also to suffer. Five men were invalidated on account of disability following conjunctivitis.

*Diseases of the Circulatory System.*—The rate of admissions is a little higher than in 1875; 14 of the admissions were on account of palpitation, 13 of them being in the 57th Regiment.

*Diseases of the Respiratory System,* are in a slightly lower rate than that that for 1875.

*Diseases of the Digestive System.*—The rate of prevalence is 57·4 per 1,000 men, or one-fourth less than in the preceding year, and the rate of mortality is less than one-half. Dysentery, and diarrhoea together, caused considerably more than one-third of the whole admissions in the order, 17 admissions were due to hepatitis, and 20 to jaundice.

*Diseases of the Urinary System.*—The rate of admissions is 6·5 per 1,000 men lower than in the preceding year.

*CONDITIONS, &c.—Debility.*—The rate of admissions is 7·8 per 1,000 men higher than in 1875.

*POISONS.*—7 admissions were for delirium tremens, and 2 for alcohol poisoning.

*INJURIES.—Accidental.*—Exactly the same number of admissions for accidental injuries took place as in the preceding year, but the greater strength of the present year gives a lower ratio than in 1875; no injury was fatal.

#### *Officers.*

In an average annual strength of 36 officers, only 6 attacks of illness are returned; there were no deaths; 1 officer was invalidated home.

#### *Women.*

In an average annual strength of 70 wives of non-commissioned officers and men, 24 attacks of illness are returned. No case was fatal.

#### *Children.*

In an average annual strength of 152 children of non-commissioned officers and men, there were 44 attacks of illness and 6 deaths, the proportion of the latter being 39·47 per 1,000. The deaths were due, to sunstroke 1, to convulsions 1, to teething 3, to debility 1.

#### *Native Troops.*

The native troops consisted of a company of Gun Lascars, distributed between the stations of Colombo, Trincomalee, and Galle. Their average annual strength was 88, the admissions into hospital 11, and the average constantly sick 33. No man of the corps died, or was invalidated during the year.

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#### SANITARY REPORT.

Surgeon-Major Poppelwell reports that "the sanitary condition of the barracks at all the stations in the Command has been reported as favourable during the year.

"In Colombo a new guard-room has been finished and occupied, as also a new orderly-room. A new block of barracks has been in process of building during the year, and will soon be completed. It is constructed to hold 232 men, and is on the same plan as the other blocks already erected. At all the other stations the barracks have been unaltered.

"At Colombo the water supply has been increased by additional wells connected by underground tunnel. So far there has been a larger supply, but it has yet to bear the test of the dry season of March and April.

*Ceylon.*

"At *Kandy and Galle* the scarcity of water continues. The waterworks at Kandy have been commenced by the local authorities, and a liberal supply of good water may be anticipated.

"At all stations except Trincomalee, the dry-earth system is in use in the latrines; arrangements are, however, being made to bring it into use.

"The lighting of the barrack-rooms continues to be effected by oil-lamps, which give a very feeble light; kerosine lamps are shortly to be introduced. In Colombo, where gas is in use, it would be an immense boon to have it introduced into the barrack-rooms. In the recreation-room of the infantry regiment at that station gas is burned, the extra expense being defrayed from the regimental funds.

"The rations have been fair considering the climate. Beef is the only meat issued—tough, stringy, and tasteless. Potatoes are issued twice a-week, but are not always obtainable; native vegetables are in abundance.

"In all the kitchens, except one at Galle, Benham's ranges are in use.

"Drunkenness prevails largely; in the native shops liquor is easily procurable, and the climate and want of occupation and amusement are great incentives to drinking.

"There has been no excessive duty, and the parades are carried on in early mornings and in evenings, so as to avoid exposure to the sun.

"The hospitals at all stations are reported good and suitable to the climate; they have never been overcrowded, and the diets have been as good as could be got.

"The invalids have been sent home in small numbers (four or five at a time) by the mail steamer from Galle during the year, with great benefit to the sick, and relief to the hospitals.

"The station of Newara Eliya has been unoccupied during the whole year, and as it has been decided to give it up altogether, the buildings have been handed over to the civil authorities. The facilities for sending invalids to England have done away with the necessity of keeping up a sanitarium, which benefited only a small class of the diseases of the climate, and probably never thoroughly recruited any.

"Cholera has occurred amongst the natives during the whole year in different parts of the island, but never as an epidemic. The disease is imported from the Indian coast by the coolies, who arrive in large numbers for work on the coffee estates in the interior. There has been no case among the troops, European or Native."

## *Section II.*

### *On the Extent of Invaliding.*

Twenty-eight non-commissioned officers and men, were invalided during the year being in the rate of 26·02 per 1,000; this is 16·57 per 1,000 lower than the rate for the preceding year. Thirteen men from the Command were discharged the service at Netley, showing a fractional reduction on the rate of the preceding year.

The classes and orders of the diseases, to which the invaliding of the year was due, are shown in the following Table :—

| Strength 1,076.                   | Invalids<br>sent to<br>England. | Invalids<br>Discharged<br>at Netley. |
|-----------------------------------|---------------------------------|--------------------------------------|
| Diseases.                         |                                 |                                      |
| <i>I. General Diseases.</i>       |                                 |                                      |
| Constitutional Group .. ..        | 4                               | 3                                    |
| <i>II. Local Diseases.</i>        |                                 |                                      |
| Diseases of the—                  |                                 |                                      |
| Nervous System .. ..              | 1                               | ..                                   |
| Eye .. ..                         | 6                               | ..                                   |
| Ear .. ..                         | 1                               | 2                                    |
| Circulatory System .. ..          | 3                               | 5                                    |
| Respiratory „ .. ..               | 1                               | ..                                   |
| Digestive „ .. ..                 | 7                               | ..                                   |
| <i>III. Debility</i> .. ..        | 4                               | 2                                    |
| <i>V. Injuries.</i>               |                                 |                                      |
| Accidental .. ..                  | 1                               | 1                                    |
| Total .. ..                       | 28                              | 13                                   |
| Ratio per 1,000 of Mean { 1876 .. | 26·02                           | 12·08                                |
| Strength .. .. { 1866-75          | 40·36                           | 17·84                                |

## Section III.

*Mean Daily Sick.*

The average number of non-commissioned officers and men constantly sick (European Troops), was 54·98.

The usual information calculated from this number is given in the following Table :—

|                                              | 1876.          | 1866-75.       |
|----------------------------------------------|----------------|----------------|
| Ratio per 1,000 of Strength constantly sick  | 51·10          | 50·76          |
| Average sick-time to each Soldier .. ..      | Days.<br>18·65 | Days.<br>19·53 |
| Average duration of each case of Sickness .. | 25·24          | 16·92          |

All the ratios compare unfavourably with those of the preceding year, the number of men always in hospital being 4·99 per 1,000 higher, the average sick time to each man being 1·82 days, and the average duration of each case of sickness 3·67 days longer. These results are accounted for by the fact that the invalids of the year remained longer in the Command than in the preceding year.

*Ceylon.**Section IV.**On the Influence of Age on Mortality.*

The death-rates of the non-commissioned officers and men, at the several ages, arranged in quinquennial periods, are shown in the following Table :—

| Corps.                          | Under 20. |       | 20 and under 25. |       | 25 and under 30. |       | 30 and under 35. |       | 35 and under 40. |       | 40 and upwards. |       |
|---------------------------------|-----------|-------|------------------|-------|------------------|-------|------------------|-------|------------------|-------|-----------------|-------|
|                                 | Strength. | Died. | Strength.        | Died. | Strength.        | Died. | Strength.        | Died. | Strength.        | Died. | Strength.       | Died. |
| Royal Artillery .. ..           | 4         | ..    | 47               | 1     | 66               | 1     | 33               | 1     | 20               | ..    | 6               | 1     |
| 57th Foot .. ..                 | 26        | ..    | 513              | 3     | 180              | 1     | 63               | ..    | 69               | ..    | 15              | ..    |
| Total .. ..                     | 30        | ..    | 560              | 4     | 246              | 2     | 96               | 1     | 89               | ..    | 21              | 1     |
| Rate per 1,000 of Mean Strength | 1876 ..   | ..    | 7·14             | 8·13  | 10·42            | ..    | 47·62            |       |                  |       |                 |       |
|                                 | 7 years   | 3·20  | 13·55            | 25·07 | 14·95            | 38·72 | 37·81            |       |                  |       |                 |       |

# XI.—ON THE HEALTH OF THE TROOPS SERVING IN CHINA, AND THE STRAITS SETTLEMENTS.

## Section I.

### *Sickness and Mortality of the Troops in China, and the Straits Settlements.*

#### STATISTICAL REPORT.

##### 1. EUROPEAN TROOPS.

The White Troops had an average annual strength of 2,589 non-commissioned officers and men, amongst whom the admissions into hospital were 2,614, being in the rate of 1009·7 per 1,000 men. The deaths in the Command, and those of invalids on the passage home, or after arrival, were 42; being in the rate of 16·22 per 1,000 men. The average number of constantly sick was 107·01, or 41·33 per 1,000 of the strength. The rate of admissions is 54·0, that of deaths is 2·25, and that of constantly sick is 1·05 per 1,000 men higher than the corresponding rate of the preceding year.

The proportions in which the two divisions of the Command contributed to these results, are shown in the following Table :—

| Stations.               | Average Annual Strength. | Admitted into Hospital. | Died. | Invalided. | Average Daily Sick. | Ratio per 1,000 of Strength. |       |            |             | Average Sick time to each Soldier. | Average duration of each case of Sickness. |
|-------------------------|--------------------------|-------------------------|-------|------------|---------------------|------------------------------|-------|------------|-------------|------------------------------------|--------------------------------------------|
|                         |                          |                         |       |            |                     | Admitted.                    | Died. | Invalided. | Daily Sick. |                                    |                                            |
| Hong Kong ...           | 912                      | 522                     | 4     | 17         | 27·7                | 572·4                        | 4·39  | 18·64      | 30·37       | 11·09                              | 19·37                                      |
| Straits Settlements ... | 1,677                    | 2,092                   | 38    | 44         | 79·31               | 1,247·5                      | 22·66 | 26·24      | 47·29       | 17·26                              | 13·84                                      |

For the Hong Kong portion of the Command, the results are very favourable; as compared with those of the preceding year, the admission rate is 120·0, the death rate is 5·05, and the rate of invaliding is 8·64 per 1,000 of the strength, lower. The rate of constantly sick is 1·09 per 1,000 men higher than in 1875, but the value of this indication of the health of the troops is affected by the influence of the longer, or shorter stay of invalids in the Command. The large reduction in prevalence of sickness is stated by the medical officer of the hospital to be mainly due to the replacement of a regiment which had served for some years in tropical countries, by one sent from Malta; a great decrease of ague amongst the troops at Hong Kong resulted from this measure; the medical officer is also of opinion, that the extension of drainage in the vicinity of the quarters, had an appreciable ameliorating effect as regards the prevalence of that disease.

For the Straits Settlements, both the admission and the death rates are higher than those of the preceding year, that of invaliding is lower. The troops in this portion of the Command were employed on field service during a part of the year, and detachments of them were subsequently quartered in the vicinity of the scene of operations.

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The troops stationed in the Command during the year, were the 3rd and 9th Batteries of the 2nd Brigade Royal Artillery, and the 3rd Battery of the 5th Brigade, a small detachment of Royal Engineers, the 1st Battalion of the 3rd Foot for part of the year, the 1st Battalion of the 10th Foot, the 28th Foot for part of the year, and the 80th Foot. A detachment of the Army Hospital Corps, and a few non-commissioned officers of the Garrison Staff, were also comprised in the force.

The admissions and deaths in the various classes and orders of diseases, are shown in the following Table:—

| Order. | Strength .. ..                         | 2,589.    |                    |              |        | Ratio per 1,000<br>of Mean Strength. |       |           |       |
|--------|----------------------------------------|-----------|--------------------|--------------|--------|--------------------------------------|-------|-----------|-------|
|        | Diseases.                              | Admitted. | Died.              |              |        | 1876.                                |       | 1869-75.  |       |
|        |                                        |           | In the<br>Command. | Of Invalids. | Total. | Admitted.                            | Died. | Admitted. | Died. |
|        |                                        |           |                    |              |        |                                      |       |           |       |
|        | <i>I. General Diseases.</i>            |           |                    |              |        |                                      |       |           |       |
| 1      | Febrile Group ..                       | 680       | 3                  | ..           | 3      | 262·6                                | 1·16  | 451·6     | 1·95  |
| 2      | Constitutional „                       | 195       | 1                  | 1            | 2      | 75·3                                 | ·77   | 120·3     | 2·41  |
|        | <i>II. Local Diseases.</i>             |           |                    |              |        |                                      |       |           |       |
|        | <i>Diseases of the—</i>                |           |                    |              |        |                                      |       |           |       |
| 1      | Nervous System ..                      | 61        | 3                  | ..           | 3      | 23·6                                 | 1·16  | 18·1      | 1·20  |
| 2      | Eye .. ..                              | 32        | ..                 | ..           | ..     | 12·4                                 | ..    | 20·4      | ..    |
| 3      | Ear .. ..                              | 18        | ..                 | ..           | ..     | 7·0                                  | ..    | 12·7      | ..    |
| 4      | Nose .. ..                             | 2         | ..                 | ..           | ..     | ·8                                   | ..    | ·4        | ..    |
| 5      | Circulatory System ..                  | 60        | 2                  | 1            | 3      | 23·2                                 | 1·16  | 21·8      | 1·39  |
| 6      | Absorbent „ ..                         | 35        | ..                 | ..           | ..     | 13·5                                 | ..    | 17·1      | ..    |
| 8      | Respiratory „ ..                       | 96        | 3                  | 1            | 4      | 37·1                                 | 1·54  | 50·9      | ·93   |
| 9      | Digestive „ ..                         | 710       | 17                 | 5            | 22     | 274·2                                | 8·50  | 262·0     | 3·06  |
| 10     | Urinary „ ..                           | 165       | ..                 | ..           | ..     | 63·7                                 | ..    | 84·8      | ·18   |
| 11     | Generative „ ..                        | 25        | ..                 | ..           | ..     | 9·6                                  | ..    | 21·3      | ..    |
| 12     | Organs of Locomotion                   | 3         | ..                 | ..           | ..     | 1·2                                  | ..    | 5·1       | ·10   |
| 13     | Cellular Tissue ..                     | 44        | ..                 | ..           | ..     | 17·0                                 | ..    | 28·0      | ..    |
| 14     | Cutaneous System ..                    | 164       | ..                 | ..           | ..     | 63·3                                 | ..    | 96·1      | ..    |
|        | <i>III. Conditions, &amp;c.</i>        |           |                    |              |        |                                      |       |           |       |
|        | Debility .. ..                         | 94        | 1                  | 1            | 2      | 36·3                                 | ·77   | 22·4      | ·10   |
|        | <i>IV. Poisons</i> ..                  | 14        | 1                  | ..           | 1      | 5·4                                  | ·39   | 13·3      | 1·11  |
|        | <i>V. Injuries.</i>                    |           |                    |              |        |                                      |       |           |       |
| 1      | Battle .. ..                           | 16        | ..                 | ..           | ..     | 6·2                                  | ..    | 1·8       | ·18   |
| 2      | Accidental .. ..                       | 187       | 2                  | ..           | 2      | 72·2                                 | ·77   | 106·6     | ·74   |
| 3      | Homicidal .. ..                        | ..        | ..                 | ..           | ..     | ..                                   | ..    | ·1        | ·18   |
| 4      | Self-inflicted .. ..                   | ..        | ..                 | ..           | ..     | ..                                   | ..    | ·4        | ·10   |
| 5      | Judicial .. ..                         | 3         | ..                 | ..           | ..     | 1·2                                  | ..    | ..        | ..    |
|        | <i>VI. Surgical Operations</i>         | ..        | ..                 | ..           | ..     | ..                                   | ..    | ·4        | ..    |
|        | No appreciable disease                 | 10        | ..                 | ..           | ..     | 3·9                                  | ..    | 2·0       | ..    |
|        | Total.. ..                             | 2,614     | 33                 | 9            | 42     | 1009·7                               | 16·22 | 1357·6    | 13·63 |
|        | Average of 10 years, }<br>1866-75 .. } | ..        | ..                 | ..           | ..     | 1471·6                               | 17·02 | ..        | ..    |

**GENERAL DISEASES.**—The rate of admissions exceeds that of the preceding year by 32·0 per 1,000 men; an excess occurs in both groups of the class; on the other hand, the rate of mortality is 1·30 per 1,000 men lower than that for the preceding year; the decrease occurs mainly in the rate of the constitutional group of diseases. *China and Straits Settlements.*

The admissions and deaths from the principal diseases in this class are shown in the following Table:—

| General Diseases.               | Admitted. | Died. | Ratio per 1,000. |       |           |       |
|---------------------------------|-----------|-------|------------------|-------|-----------|-------|
|                                 |           |       | 1876.            |       | 1869-75.  |       |
|                                 |           |       | Admitted.        | Died. | Admitted. | Died. |
| <i>Febrile Group—</i>           |           |       |                  |       |           |       |
| Eruptive Fevers .. .. .         | 1         | 1     | ·4               | ..    | 1·5       | ..    |
| Continued „ .. .. .             | 244       | 1     | 94·2             | ·77   | 122·2     | 1·39  |
| Paroxysmal „ .. .. .            | 420       | 1     | 162·2            | ·39   | 323·4     | ·37   |
| Cholera .. .. .                 | ..        | ..    | ..               | ..    | ·3        | ·19   |
| Influenza .. .. .               | 8         | ..    | 3·1              | ..    | 2·3       | ..    |
| Erysipelas .. .. .              | 3         | ..    | 1·2              | ..    | 1·6       | ..    |
| Other diseases .. .. .          | 4         | ..    | 1·5              | ..    | ·3        | ..    |
| Total .. .. .                   | 680       | 3     | 262·6            | 1·16  | 451·6     | 1·95  |
| <i>Constitutional Group—</i>    |           |       |                  |       |           |       |
| Rheumatism .. .. .              | 86        | ..    | 33·2             | ..    | 37·8      | ·10   |
| Syphilis .. .. .                | 85        | ..    | 32·9             | ..    | 70·5      | ·18   |
| Scrofula, Phthisis, &c. .. .. . | 15        | 2     | 5·8              | ·77   | 8·8       | 1·85  |
| Scurvy and Purpura .. .. .      | 1         | ..    | ·4               | ..    | ·3        | ..    |
| Anæmia .. .. .                  | 4         | ..    | 1·5              | ..    | 1·4       | ..    |
| Other diseases .. .. .          | 4         | ..    | 1·5              | ..    | 1·5       | ·28   |
| Total .. .. .                   | 195       | 2     | 75·3             | ·77   | 120·3     | 2·41  |

*Eruptive Fevers.*—The admission was that of a man of the 28th Regiment, for chicken-pox.

*Continued Fevers.*—The rate of admissions exceeds that of the preceding year by 43·0 per 1,000 men, being nearly double. *Enteric Fever.*—Of the four admissions, two were those of men of the 3rd Battery 2nd Brigade Royal Artillery, and two those of men of the 1st Battalion 10th Foot; both corps were stationed in the Straits Settlements, but the particular stations there, where the men were attacked, are not stated. *Simple Continued Fever.*—Of the 120 admissions under this head, all, excepting one, took place in the Straits Settlements; they were relatively most numerous in the 80th Regiment, in which also the death from this disease occurred. *Febricula.*—More than half of the 120 admissions for this disease occurred at Hong Kong. The medical officer of the hospital there states with reference to them that the greater number were due to intemperance, though a few may possibly have been admissions for ague of an imperfectly marked kind.

*Paroxysmal Fevers.*—The rate of admissions exceeds that of 1875 by 14·0 per 1,000 men; excepting 39 they all occurred amongst the troops in the Straits Settlements, more than two-thirds of them in the 80th Regiment; the death was due to remittent fever.

*Other Diseases.*—The admissions were for mumps.

*Rheumatism.*—There is a small reduction in the rate of prevalence on that of the preceding year.

*Syphilis.*—The rate of prevalence is 21·4 per 1,000 men, lower than that of the preceding year.

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*Scurvy, &c.*—One admission only is returned for scurvy; as a considerable part of the force was employed in the field during the year, this comparative immunity from an affection so common in a state of warfare would be striking, were it not for the doubt raised by the remarks of one of the medical officers, which are quoted below.

*LOCAL DISEASES.—Diseases of the Nervous System.*—The rate of admissions is double that of the preceding year, but the rate of mortality is only fractionally higher. More of the admissions in this order were due to neuralgia than to any other disease; there were 14 admissions for sunstroke, half of which occurred in the 80th Regiment; only one death from this affection, however, is returned.

*Diseases of the Eye.*—The rate of admissions is only the half of that of 1875.

*Diseases of the Circulatory System.*—The rate of admissions exceeds that of the preceding year by 4.0 per 1,000 men, the rate of mortality is fractionally higher; more than half of the admissions were for palpitation.

*Diseases of the Respiratory System.*—There is a small increase in the rate of admissions on that of the preceding year; the rate of deaths is nearly three-fold higher. The fatal illnesses were bronchitis in one instance, and pneumonia in three.

*Diseases of the Digestive System.*—The rate of admissions exceeds that of the preceding year by 62.0 per 1,000 men, the death rate is 2.59 per 1,000 men higher; these results are attributable to the exposure of the troops on field service, by which the admissions for diseases of the liver, and of the bowels, were increased. The medical officer of the 1st Battalion 10th Foot states that the admissions from diseases of the bowels in that regiment gave nearly one-fourth part of all admissions, and that "many cases of diarrhoea and of dysentery were attributable to the want of proper dieting, and to exposure."

*Diseases of the Urinary System.*—The rate of admissions exceeds that of 1875 by 10.0 per 1,000 men.

*CONDITIONS, &c.—Debility.*—The rate of admissions exceeds that of the preceding year by 17.5 per 1,000 men, being nearly double.

*POISONS.*—There is a decrease of 4.0 per 1,000 men in the rate of admissions compared with that of 1875.

*INJURIES.—Battle.*—The nature of the injuries received in battle is not mentioned in any of the reports, except in that from the 1st Battalion 10th Foot, in which instance the injury was from a gunshot. *Accidental.*—The rate of admissions is 15.0 per 1,000 men lower than that of the preceding year; both of the accidental deaths were from drowning.

#### *Officers.*

The average annual strength of the officers in the Command was 132; the attacks of illness in this number were 49, and one death (returned as due to colic) took place in the Command. More attacks of illness were from dysentery, than from any other disease.

#### *Women.*

In an annual average strength of 115, wives of non-commissioned officers and men, there were 39 attacks of illness, and (in the Command) two deaths; one of the latter was due to hepatitis, and one was consequent on the puerperal state.

#### *Children.*

In an annual average strength of 204 children of non-commissioned officers and men, there were 81 attacks of illness, and (in the Command) five deaths; the latter are in the rate of 24.51 per 1,000 of the strength. No illness was due to any kind of eruptive fever; ague, diarrhoea, and debility, caused more attacks of illness than any other diseases. The deaths were due to meningitis (1), to teething (1), to diarrhoea (1), to debility (2).



## 2. ASIATIC TROOPS.

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The Asiatic Troops stationed in the Command\* consisted of a company of Gun Lascars stationed at Hong Kong, having an average annual strength of 64 non-commissioned officers and men. The admissions into hospital were 41, being in the annual rate of 640·6 per 1,000 men. There were no deaths; no soldier was invalided. The rate of admissions is 208 per 1,000 men lower than that of the preceding year; one-fourth of the admissions were on account of ague, and of the remainder nearly two-thirds were for gonorrhoea.

## SANITARY REPORT.

Deputy Surgeon-General Gilborne remarks, that as he only arrived in the China Command and took over the duties of Principal Medical Officer in November of the year to which this report refers, he is not able to enter as fully as he could wish into the various subjects connected with the sanitary history of the troops during the year 1876.

*Hong Kong.*—The following improvements and additions to the sanitary arrangements in the barracks, &c., at this station, have been carried out or commenced during the past year:—

“Ventilation in the roofs at Murray Barracks provided; the drainage at Wellington Barracks improved; the women’s latrine and wash-house erected at North Barracks; latrine accommodation at Spring Gardens improved; latrines at Commissariat Buildings reconstructed; ventilation to old Garrison Hospital provided; surface drainage of Victoria Barracks improved; latrines and urinals at Murray Barracks reconstructed; the drains of all the barracks ventilated.

“*Barracks.*—The same barracks were occupied as during the previous year, viz., North Murray, Victoria, Wellington, and McGregor’s (hired) Buildings, with the East and West Blocks for married families, and Spring Gardens for the staff. All the buildings have been thoroughly lime-washed and kept in good repair, and the amount of space allowed, both cubic and superficial, has been sufficient; and the vicinity of the barracks generally has been in good sanitary condition.

“*Lighting.*—The old system of lighting, which has been so often complained of, still exists, i.e., one small tin oil lamp to each room, which is useless to read by. The luxury of good light would, doubtless, be highly appreciated by the men; and as gas is now in such universal use in the colony, it is a matter of regret that it has not been introduced into the barracks, where it would add greatly to the cheerfulness of the rooms and the comfort of the men.

“*Rations.*—There has been no alteration in the scale of diet during the year, and the quality of the rations has, on the whole, been good. The monotony of the meat portion of the diet, which is always beef, has been much felt. The occasional issue of a ration of mutton has been proposed more than once, but its high price forms an insuperable objection. The supply of vegetables is good and sufficient.

“*Water.*—The water has been abundant and of good quality.

“*Clothing.*—The clothing has been well suited to the varying nature of the climate.

“*Duties.*—The duties have not been heavy,—the usual guards, parades, &c.,—and have exercised no unfavourable influence on health.

“*Hospital Establishment.*—All the sick of the garrison are treated in the hospital ship ‘Meeanee,’ moored in the middle of the harbour. The vessel is in good repair, sufficiently ventilated, and has not been overcrowded.

“A boiler and tank, for hot water to be laid on to the baths on each deck, are about to be put up, and a great want will thereby be supplied. A lift, from deck to deck, is much required for the service of the hospital. It was brought forward in the estimates, but has not been sanctioned. The medical

\* A regiment of Native Infantry of the Bengal Army formed part of the Expeditionary Force serving in the Malay Peninsula during part of the year; the returns of the sickness of this corps have not been compiled.

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officer in charge of the hospital points out how necessary it is that means should be provided for transporting the sick to the hospital ship, either sitting or lying down, dressed or in bed, and efficiently protected from sun, or wind and weather. The proper conveyance would be a steam launch, with a deck-house, affording room for at least a dozen men, and a moveable bed or stretcher, on which they could be lifted in and out, when not able to walk. The existing means of transport are objectionable. An open pulling boat, with a canvas awning (which cannot be used in rough weather), is not suitable for the hospital service.

"I would also draw attention to the many risks to which the 'Meeanee' is exposed during the fearful typhoons which sometimes rage in the China Seas,—to say nothing of the ever-present danger of being run into by other vessels in such a crowded harbour as Hong Kong.

"The only remedy, in my opinion, is to have an hospital on shore, which, I think, would, in the long run, be less expensive to maintain than the 'Meeanee,' besides being more convenient, more comfortable, and free from continual danger.

"The year 1876 has been the healthiest ever enjoyed by British troops in the colony of Hong Kong, and the number of admissions and deaths has been lower than during any previous year. The admissions amounted to 522, and the deaths, in hospital, to 2 only. One man also died out of hospital,—found drowned.

"The satisfactory results of the past year are in a great measure due to the great sanitary improvements which have taken place at this station, and from being, as formerly, one of the most unhealthy, Hong Kong can now compare favourably with any other foreign station.

"*Straits Settlements.*—Besides the stations of Singapore, Penang and Malacca, in the Straits Settlements, troops have during the year occupied out-posts in the Malay Peninsula, viz., Blanja, Banda Bäteru, Qualla Kangsa, Kinta, and Sunjhie Ujory. I will, therefore, deal first with the fixed stations, Singapore, Penang, and Malacca.

"*Barracks.*—The barracks—consisting of Fort Canning and Tanglin in Singapore, Fort Cornwallis and the Lines at Penang, and the Infantry Lines at Malacca—are reported well constructed, sufficiently ventilated, and amply spacious for the number of their occupants. The walls of the rooms have been thoroughly lime-washed, and cleanliness has been observed both within and without the buildings.

"*Rations.*—The rations have been of good quality, and no change has taken place in the quantity. Beef was the only meat issued, and is reported to have been of good quality. The vegetables are of various kinds, and seem to have had a beneficial effect upon health.

"*Water.*—The water is obtained from wells, and has been good and sufficient.

"*Clothing.*—White clothing is in general use, and is well adapted to the climate. Serge is worn by men on night duty in the wet season.

"*Duties.*—The duties, comprising guards, parades, drills, &c., have been in no way excessive. At Penang, they were slightly heavier than usual, owing to the withdrawal of troops to occupy Perak.

"*Drainage.*—The drainage was reported satisfactory during the year.

"*Hospitals.*—At Singapore there are two hospitals, Fort Canning and Tanglin; the former used for the Royal Artillery and a small detachment of infantry stationed at the Fort, and the latter (4 miles away) for the 80th Regiment. They are in good condition, well ventilated, and ample in accommodation for the average number of patients. The hospital at Penang has accommodation for 26 patients. During the early part of the year the space was rather limited, owing to the influx of patients from the Perak Field Force; but, considering the ordinary strength of the garrison, the accommodation is sufficient for ordinary cases. Additional accommodation is, however, required for the treatment of contagious diseases.

"At Malacca, the hospital was slightly overcrowded on one or two occasions, but the average space was sufficient. A large house, facing the sea, has been purchased for the purpose of turning it into a hospital more suitable for the requirements of the troops, and will probably be soon taken over for occupation.

*The Out-Posts in the Malay Peninsula.**China and  
Straits  
Settlements.*

"The huts in the camps generally were of the ordinary Malay pattern, built on piles a few feet above the ground. The flooring consisted of bamboos, crossed in the form of a grating; the side walls were also made of bamboo, flattened and plaited; while the roofing was made of the *Nepas* palm. Owing to the malarious nature of the country, it is a most important point that the huts should be raised from the ground. The huts erected at Qualla Kangsa, at the commencement of the Perak campaign, were *not* raised from the ground, and the sickness was very great in consequence. The ventilation of the huts was so perfect that overcrowding was never complained of.

"When the stations on the Perak river were first occupied, river water was used for every purpose, but it was found so impure, owing to the nuisances committed in it by the Malays, that it was deemed advisable to employ Norton's tubular well-pumps, and, as an additional precaution, to have the water boiled and filtered before being used. After that measure was adopted, dysentery and diarrhoea became much less prevalent. The quality of the water was good, and the supply ample.

"*Rations.*—Owing to the difficulty of communicating with the out-posts, it was some time before supplies of fresh provisions could be regularly forwarded to some of them, notably Kinta, where, in the early part of the occupation, the health of the men evidently suffered from the continued use of preserved meats. Buffaloes were shot occasionally, but the flesh was extremely tough and not very digestible. On the issue of fresh meat and vegetables, the men's health rapidly improved.

"*Clothing.*—White clothing was in use during the day, and serge at night.

"*Hospitals.*—The best situated hut at each encampment was used as an hospital. The accommodation was generally sufficient for the number of sick, and the ventilation was carefully attended to.

"*Sickness.*—The prevailing diseases at the out-posts were diarrhoea, dysentery, and fevers.

"I may add that, on the whole, it may be considered that the health of the troops in the Command during the year 1876 has been remarkably good. The Straits Settlements, in proportion to their strength as compared with Hong Kong, have furnished more than 2 to 1 of the admissions at the latter place. But, considering the trying nature of service in the interior of the Malay Peninsula, and the long residence in the East of the 1st Battalion 10th Regiment, which furnished the greater part of the garrisons at the out-posts, the results may be deemed satisfactory.

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## Section II.

*China and  
Straits  
Settlements.*

*On the Extent of Invaliding.*

The causes of the invaliding are shown in the following Table :—

| Mean Strength .. .. .                 | White Troops                       |                            |
|---------------------------------------|------------------------------------|----------------------------|
|                                       | 2,589.                             |                            |
| Disabilities.                         | Sent<br>to England<br>as Invalids. | Discharged<br>as Invalids. |
| Simple Continued Fever.. .. .         | 1                                  | ..                         |
| Remittent Fever .. .. .               | 2                                  | ..                         |
| Rheumatism .. .. .                    | 8                                  | 1                          |
| Secondary Syphilis .. .. .            | 1                                  | ..                         |
| Phthisis .. .. .                      | 2                                  | ..                         |
| Diabetes .. .. .                      | 1                                  | ..                         |
| Meningitis .. .. .                    | 1                                  | ..                         |
| Softening of the Brain .. .. .        | ..                                 | 1                          |
| Epilepsy .. .. .                      | 1                                  | 1                          |
| Dementia .. .. .                      | 8                                  | ..                         |
| Hemiplegia .. .. .                    | 1                                  | ..                         |
| Staphyloma .. .. .                    | 1                                  | ..                         |
| Valve Diseases of the Heart .. .. .   | 6                                  | 3                          |
| Hypertrophy " " .. .. .               | 1                                  | 1                          |
| Palpitation " " .. .. .               | 5                                  | 5                          |
| Varicose Veins .. .. .                | 1                                  | 1                          |
| Inflammation of Glands .. .. .        | ..                                 | 1                          |
| Bronchitis.. .. .                     | 2                                  | ..                         |
| Dysentery.. .. .                      | 6                                  | 1                          |
| Hepatitis .. .. .                     | 5                                  | ..                         |
| Bright's Disease .. .. .              | ..                                 | 1                          |
| Stricture of Urethra .. .. .          | 1                                  | ..                         |
| Orchitis .. .. .                      | ..                                 | 1                          |
| Ulcer .. .. .                         | 1                                  | ..                         |
| Boils .. .. .                         | 1                                  | ..                         |
| Debility .. .. .                      | 10                                 | 1                          |
| Gunshot injuries (Battle) .. .. .     | 6                                  | 4                          |
| Total .. .. .                         | 61                                 | 22                         |
| Annual Ratio per 1,000 { 1876 .. .. . | 23.56                              | 8.50                       |
| of Mean Strength .. { 1866-75 .. .. . | 56.50                              | 28.82                      |

The rate of primary invaliding is 18.89 per 1,000 men, and that of final invaliding is 6.06 per 1,000 lower than the corresponding rate of the preceding year.



## XII.—ON THE HEALTH OF THE TROOPS SERVING IN THE FIJI ISLANDS.

### Section I.

#### *Sickness and Mortality.*

#### STATISTICAL REPORT.

*Fiji Islands.* THE force in this Command consisted of the 6th Company of Royal Engineers, having an annual average strength of 57 non-commissioned officers and men, amongst whom there were 114 admissions into hospital, 3 deaths, and an average constantly sick of 5·05; 5 men were invalided. The ratios given by these numbers are, for admissions 2000·0, for deaths 52·63, for constantly sick 88·60, and for invalids 87·72 per 1,000 of the strength respectively.

*General Diseases.*—The admissions in this class were 28, being in the proportion of 491·2 per 1,000 of the strength; excepting 3 returned in the *constitutional group*, all the admissions were for *febricula*, and the illnesses appear to have been of the same nature as the ordinary ardent fever of hot countries.

No admission for fever of a paroxysmal kind is returned.

*Diseases of the Nervous System.*—The 7 admissions for diseases in this order, are in the rate of 121·8 per 1,000 of the strength, 3 of them were on account of sunstroke, two of the attacks of which were of the congestive kind (heat apoplexy), were fatal, one attack (which ended favourably) was due to the direct effect of the rays of the sun.

*Diseases of the Digestive System.*—47 admissions are returned in this order, being in the proportion of 824·6 per 1,000 of the strength, more than half of the admissions however were for dyspepsia; the significance of the greatly preponderating frequency of diseases of the digestive system in the Command is destroyed by the fact that dyspepsia is not necessarily in relation to climatic peculiarities; respecting these admissions the medical officer writes that “the larger proportion was due to excessive drinking.” Diarrhoea, caused 6 admissions, and hepatitis 8. One admission was due to peritonitis, concerning the attack (which was fatal), the medical officer remarks that no cause could be assigned for it but exposure when the man was in a state of intoxication, and in another part of his report he mentions that the drink used by the men was of a very deleterious kind, it may therefore be surmised that the death might with more accuracy have been returned in the class of poisons.

*Diseases of the Cutaneous System*, caused 13 admissions, 4 of them being for prickly heat.

*Conditions, &c., General Debility*, caused 5 admissions.

### Section II.

#### *Invaliding.*

The cause of invaliding was epilepsy, in one instance, hepatitis in one, and debility in three.

### Section III.

#### *Mean Daily Sick.*

The average number constantly sick was 5·05, being in the rate of 88·60 per 1,000 men. The average sick time to each soldier was 32·34 days; the average duration of each case of sickness was 16·16 days.

## XIII.—ON THE HEALTH OF THE TROOPS SERVING IN INDIA.

## Section I.

*Sickness and Mortality.*

The average annual strength of the non-commissioned officers and men *India*, in India was 58,641; the admissions into hospital were 77,998, and the deaths 944, of which 890 took place in India, and 54 (being those of invalids) on the passage or after arrival in England. The average number of constantly sick was 3,130. The rates from these numbers are, for admissions 1330·1, for deaths 16·10 and for constantly sick 53·38 per 1,000 of the strength.

The sickness for each of the three Commands, is shown in the following Table:—

|            | Average Annual Strength. | Admitted into Hospital. | Deaths.   |              |        | Invalids. | Constantly sick. | Ratio per 1,000 of Mean Strength. |       |           |                  | Average Sick time to each Soldier. | Average duration of each case of Sickness. |
|------------|--------------------------|-------------------------|-----------|--------------|--------|-----------|------------------|-----------------------------------|-------|-----------|------------------|------------------------------------|--------------------------------------------|
|            |                          |                         | In India. | Of Invalids. | Total. |           |                  | Admitted.                         | Died. | Invalids. | Constantly sick. |                                    |                                            |
|            |                          |                         |           |              |        |           |                  |                                   |       |           |                  | Days                               | Days                                       |
| Bengal ... | 37,147                   | 52,482                  | 588       | 27           | 615    | 1,326     | 2,060            | 1412·8                            | 16·55 | 35·69     | 55·46            | 20·24                              | 14·38                                      |
| Madras ... | 11,132                   | 12,224                  | 174       | 11           | 185    | 478       | 561              | 1098·1                            | 16·62 | 42·94     | 50·40            | 18·39                              | 16·75                                      |
| Bombay ... | 10,362                   | 13,292                  | 128       | 16           | 144    | 482       | 509              | 1282·8                            | 13·90 | 46·52     | 49·12            | 17·94                              | 13·91                                      |
| Total ...  | 58,641                   | 77,998                  | 890       | 54           | 944    | 2,286     | 3,130            | 1330·1                            | 16·10 | 38·98     | 53·38            | 19·48                              | 14·65                                      |

## I.—BENGAL.

## STATISTICAL REPORT.

The average annual strength of the non-commissioned officers and men *Bengal*, was 37,147; the admissions into hospital were 52,482; the deaths, including those of invalids who died at sea or after arrival in England were 615; the average number of constantly sick was 2,060. The rate of admissions is 1,412·8, that of deaths is 16·55, and that of constantly sick is 55·46 per 1,000 of the average annual strength. The rate of admissions is 59·4 per 1,000 men higher than in the preceding year, the death-rate is 1·83 lower, and and the rate of constantly sick is 77 per 1,000 lower.

Bengal.

The admissions and deaths in the different classes and orders of diseases, are shown in the following Table :—

| Orders. | Diseases.                                | Strength, 37,147. |             |              |        | Ratio per 1,000 of Mean Strength. |       |           |       |
|---------|------------------------------------------|-------------------|-------------|--------------|--------|-----------------------------------|-------|-----------|-------|
|         |                                          | Admitted.         | Deaths.     |              |        | 1876.                             |       | 1869-75.  |       |
|         |                                          |                   | In Command. | Of Invalids. | Total. | Admitted.                         | Died. | Admitted. | Died. |
|         | <i>General Diseases.</i>                 |                   |             |              |        |                                   |       |           |       |
| 1       | Febrile Group ..                         | 21,455            | 206         | 2            | 208    | 577·6                             | 5·60  | 625·0     | 8·43  |
| 2       | Constitutional „ ..                      | 5,340             | 56          | 8            | 64     | 143·8                             | 1·72  | 159·5     | 2·20  |
|         | <i>Local Diseases.</i>                   |                   |             |              |        |                                   |       |           |       |
| 1       | Nervous System ..                        | 796               | 85          | 2            | 87     | 21·4                              | 2·34  | 20·3      | 2·36  |
| 2       | Eye .. .. .                              | 660               | ..          | ..           | ..     | 17·8                              | ..    | 28·4      | ..    |
| 3       | Ear .. .. .                              | 307               | ..          | ..           | ..     | 8·3                               | ..    | 7·4       | ..    |
| 4       | Nose .. .. .                             | 29                | ..          | ..           | ..     | ·8                                | ..    | ·6        | ·01   |
| 5       | Circulatory System ..                    | 809               | 37          | 1            | 38     | 21·8                              | 1·02  | 20·0      | 1·55  |
| 6       | Absorbent „ ..                           | 532               | 1           | ..           | 1      | 14·3                              | ·03   | 15·2      | ..    |
| 7       | Ductless Glands ..                       | 3                 | ..          | ..           | ..     | ·1                                | ..    | ·1        | ·01   |
| 8       | Respiratory System ..                    | 2,146             | 28          | 4            | 32     | 57·8                              | ·86   | 57·8      | 1·22  |
| 9       | Digestive „ ..                           | 8,070             | 114         | 7            | 121    | 217·2                             | 3·26  | 246·4     | 5·42  |
| 10      | Urinary „ ..                             | 4,097             | 9           | 1            | 10     | 110·2                             | ·27   | 103·3     | ·34   |
| 11      | Generative „ ..                          | 484               | ..          | ..           | ..     | 13·3                              | ..    | 15·1      | ..    |
| 12      | Organs of Locomotion                     | 183               | 1           | 1            | 2      | 4·9                               | ·05   | 5·1       | ·05   |
| 13      | Cellular Tissue ..                       | 433               | ..          | ..           | ..     | 11·6                              | ..    | 13·0      | ·03   |
| 14      | Cutaneous System ..                      | 2,451             | ..          | ..           | ..     | 66·0                              | ..    | 67·1      | ·01   |
|         | <i>III. Conditions, &amp;c.</i>          |                   |             |              |        |                                   |       |           |       |
|         | Debility .. ..                           | 933               | ..          | 1            | 1      | 25·1                              | ·03   | 18·4      | ·09   |
|         | <i>IV. Poisons</i> ..                    | 135               | 6           | ..           | 6      | 3·6                               | ·16   | 4·4       | ·29   |
|         | <i>V. Injuries.</i>                      |                   |             |              |        |                                   |       |           |       |
| 2       | Accidental .. ..                         | 3,561             | 22          | ..           | 22     | 95·8                              | ·59   | 86·5      | ·86   |
| 3       | Homicidal .. ..                          | 2                 | 1           | ..           | 1      | ..                                | ·03   | ..        | ·05   |
| 4       | Self-inflicted ..                        | 8                 | 20          | ..           | 20     | ..                                | ·54   | ·3        | ·57   |
| 6       | Judicial .. ..                           | 3                 | ..          | ..           | ..     | ..                                | ..    | ..        | ·02   |
|         | <i>VI. Surgical Operations</i>           | 20                | 2           | ..           | 2      | ·5                                | ·05   | ·3        | ·02   |
|         | Not specified ..                         | ..                | ..          | ..           | ..     | ..                                | ..    | ·1        | ·01   |
|         | No appreciable disease                   | 25                | ..          | ..           | ..     | ·6                                | ..    | ·9        | ..    |
|         | Total .. ..                              | 52,482            | 588         | 27           | 615    | 1412·8                            | 16·55 | 1490·2    | 23·64 |
|         | Average of 10 years, }<br>1866-75.. .. } | ..                | ..          | ..           | ..     | 1466·8                            | 24·44 | ..        | ..    |

**GENERAL DISEASES.**—Compared with 1875 there is an increase of 54·9 per 1,000 men in the rate of admissions for the class, the whole of which is in the *febrile group*; for the *constitutional group* there is a reduction of 18· per 1,000. The rate of mortality for the class is lower by 1·21 per 1,000 men, of this the *febrile group* gives ·89, and the *constitutional* 32 per 1,000 men.

The admissions and deaths from the principal diseases of this class, are shown in the following Table :—



| Strength, 37,147                   | Died.     |             |              |        | Ratio per 1,000 of Mean Strength. |       |           |       | Bengal. |
|------------------------------------|-----------|-------------|--------------|--------|-----------------------------------|-------|-----------|-------|---------|
| General Diseases.                  | Admitted. | In Command. | Of Invalids. | Total. | 1876.                             |       | 1869-75.  |       |         |
|                                    |           |             |              |        | Admitted.                         | Died. | Admitted. | Died. |         |
| <i>Febrile—</i>                    |           |             |              |        |                                   |       |           |       |         |
| Eruptive Fevers .. ..              | 699       | ..          | ..           | ..     | 18·8                              | ..    | 2·0       | ·20   |         |
| Continued „ .. ..                  | 5,432     | 70          | ..           | 70     | 146·2                             | 1·89  | 171·5     | 1·99  |         |
| Paroxysmal „ .. ..                 | 15,057    | 17          | 2            | 19     | 405·3                             | ·51   | 410·3     | 1·57  |         |
| Cholera .. ..                      | 163       | 114         | ..           | 114    | 4·4                               | 3·07  | 6·8       | 4·51  |         |
| Influenza .. ..                    | 28        | ..          | ..           | ..     | ·8                                | ..    | 1·2       | ..    |         |
| Erysipelas .. ..                   | 59        | 5           | ..           | 5      | 1·6                               | ·13   | 2·5       | ·09   |         |
| Other diseases .. ..               | 17        | ..          | ..           | ..     | ·5                                | ..    | ·7        | ·07   |         |
| Total of Febrile Group .. }        | 21,455    | 206         | 2            | 208    | 577·6                             | 5·60  | 625·0     | 8·43  |         |
| <i>Constitutional—</i>             |           |             |              |        |                                   |       |           |       |         |
| Rheumatism .. ..                   | 1,859     | ..          | ..           | ..     | 50·1                              | ..    | 52·9      | ·02   |         |
| Syphilis .. ..                     | 2,978     | 4           | ..           | 4      | 80·2                              | ·11   | 89·2      | ·11   |         |
| Scrofula, Phthisis, &c. ..         | 335       | 42          | 6            | 48     | 9·0                               | 1·29  | 10·4      | 1·86  |         |
| Scurvy and Purpura .. ..           | 9         | ..          | ..           | ..     | ·2                                | ..    | ·5        | ·02   |         |
| Anæmia .. ..                       | 142       | 3           | 1            | 4      | 3·8                               | ·11   | 5·7       | ·04   |         |
| Other diseases .. ..               | 17        | 7           | 1            | 8      | ·5                                | ·21   | ·8        | ·15   |         |
| Total of Constitutional Group .. } | 5,340     | 56          | 8            | 64     | 143·8                             | 1·72  | 159·5     | 2·20  |         |

*Eruptive Fevers.*—The rate of admissions exceeds that of 1875 by 16·6 per 1,000 men, an eight-fold increase, this result is due to the reappearance of dengue fever in an epidemic form. Of the 699 admissions for eruptive fevers 668 were due to dengue; other forms of fevers of this nature are in a lower proportion than in the preceding year. The admissions for small-pox were 6, for measles 21, for scarlet fever 1, and there were 3 admissions after vaccination.

*Continued Fevers.*—The rate of admissions is 14·9 per 1,000 men higher than that of the preceding year. The rate of mortality is fractionally lower.

*Paroxysmal Fevers.*—The rate of admissions is 43·6 per 1,000 men higher than in 1875, associated with this result is a rate of mortality lower by ·20 per 1,000, or more than a third.

*Cholera.*—This disease was epidemic in certain localities in the Command, but its rate of prevalence was 1·1 per 1,000 men (or one-fifth) less, and its rate of mortality ·61 (or one-sixth) less, than in the preceding year.

*Erysipelas.*—The rate of prevalence is 1·5 per 1,000 men lower than that of 1875.

*Rheumatism.*—Compared with the preceding year the rate of admissions is lower by 8·1 per 1,000 men.

*Syphilis.*—The rate of admissions is 11·2 per 1,000 men lower than in 1875.

*Scrofula, Phthisis, &c.*—Compared with the preceding year there is in the present, a fractionally higher rate of admissions, associated with a considerably reduced death-rate.

*LOCAL DISEASES.—Diseases of the Nervous System.*—The rate of prevalence is fractionally higher than in 1875, whilst the rate of mortality is fractionally lower.

*Diseases of the Eye.*—The rate of prevalence is lower than in 1875, by 2·5 per 1,000 men.

*Bengal.*

*Diseases of the Circulatory System.*—The rate of admissions is fractionally lower, whilst that of deaths is fractionally higher than in 1875.

*Diseases of the Respiratory System.*—The rate of admissions is 2·8, and that of deaths is 2·3 per 1,000 men lower than in 1875.

*Diseases of the Digestive System.*—The rate of admissions is 5·4 per 1,000 men lower, but the rate of deaths is 1·1 higher than in 1875.

*Diseases of the Urinary System.*—The rate of admissions is 5·9 per 1,000 men higher than in the preceding year.

*CONDITIONS, &c.—Debility.*—The rate of admissions is 5·1 per 1,000 men, or one-fifth higher than in the preceding year.

*POISONS.*—Compared with 1875 the results shown are a fractionally higher admission-rate, associated with a fractionally lower death-rate.

*INJURIES.—Accidental.*—The rate of admissions is 4·8 per 1,000 men higher than in 1875; the death-rate is 3·1 per 1,000, or nearly one-third lower. Of the 22 accidental deaths, the specific cause was a burn in one instance, multiple injury in 6, drowning in 6, impaction of a foreign body in the air-passage in 1, injury of the brain or of the skull in 5, gunshot wound in 2, and rupture of the spleen in 1. The *homicidal* death, was from a gunshot. The mode of death in the 20 *self-inflicted* deaths was by drowning in 3, by hanging in 2, by a fall from a height in 1, by cut-throat in 1, by gunshot in 12, and by wound (weapon not stated) in 1.

The admissions and deaths which took place at the chief stations in the Command, are shown in the following Table:—

| Stations.  | Average Annual Strength. | Admitted into Hospital. | Died in India. | Ratio per 1,000 of Strength. |       | Annual Ratio per 1,000. 1866-75. |        |
|------------|--------------------------|-------------------------|----------------|------------------------------|-------|----------------------------------|--------|
|            |                          |                         |                | Admitted.                    | Died. | Admitted.                        | Died.  |
| Presidency | Calcutta ..              | 973                     | 771            | 7                            | 792   | 7·19                             | 1247·1 |
|            | Dum-Dum ..               | 651                     | 896            | 10                           | 1376  | 15·36                            | 1268·0 |
|            | Barrackpore ..           | 439                     | 1,133          | 7                            | 2580  | 15·94                            | 1797·0 |
|            | Hazaribagh ..            | 101                     | 108            | 1                            | 1069  | 9·90                             | 1217·2 |
|            | Darjeeling ..            | 17                      | 13             | ..                           | 764   | ..                               | 1029·5 |
| Allahabad  | Allahabad ..             | 946                     | 1,514          | 14                           | 1600  | 14·80                            | 1748·4 |
|            | Dinapore ..              | 882                     | 1,333          | 16                           | 1511  | 18·14                            | 1518·8 |
|            | Benares ..               | 478                     | 702            | 5                            | 1468  | 10·46                            | 1520·7 |
|            | Chunar ..                | 68                      | 137            | 5                            | 2014  | 78·52                            | 2230·5 |
|            | Cawnpore ..              | 739                     | 880            | 16                           | 1190  | 21·65                            | 1617·7 |
| Oudh       | Lucknow ..               | 2,251                   | 3,510          | 30                           | 1559  | 13·22                            | 1259·1 |
|            | Fyzabad ..               | 970                     | 1,530          | 28                           | 1577  | 28·86                            | 1156·0 |
|            | Sitapur ..               | 591                     | 765            | 7                            | 1294  | 11·84                            | 1110·9 |
| Rohilkund  | Bareilly ..              | 776                     | 771            | 9                            | 993   | 11·59                            | 977·5  |
|            | Shahjehanpur ..          | 465                     | 376            | 5                            | 808   | 10·75                            | 1198·0 |
|            | Moradabad ..             | 214                     | 189            | 3                            | 883   | 14·01                            | 1047·1 |
|            | Rhanikhet ..             | 1,231                   | 933            | 18                           | 757   | 14·62                            | 1054·0 |
| Saugor     | Jubbulpore ..            | 566                     | 679            | 3                            | 1199  | 5·80                             | 1602·6 |
|            | Saugor ..                | 360                     | 462            | 4                            | 1283  | 11·11                            | 1908·5 |
|            | Nowgong ..               | 257                     | 388            | 3                            | 1509  | 11·67                            | 1704·8 |
| Gwalior    | Morar ..                 | 1,116                   | 1,227          | 7                            | 1099  | 6·27                             | 1665·8 |
|            | Fortress Gwalior ..      | 319                     | 386            | 7                            | 1210  | 21·94                            | 1295·5 |
|            | Jhansi ..                | 830                     | 983            | ..                           | 2803  | ..                               | 2563·3 |

Bengal.

| Stations.                                                |                    | Average Annual Strength. | Admitted into Hospital. | Died in India. | Ratio per 1,000 of Strength. |       | Annual Ratio per 1,000. 1866-75. |       |
|----------------------------------------------------------|--------------------|--------------------------|-------------------------|----------------|------------------------------|-------|----------------------------------|-------|
|                                                          |                    |                          |                         |                | Admitted.                    | Died. | Admitted.                        | Died. |
| Meerut ..                                                | Meerut..           | 1,454                    | 1,896                   | 24             | 1303                         | 16.50 | 1745.1                           | 33.70 |
|                                                          | Fatehgarh ..       | 227                      | 207                     | 2              | 911                          | 8.81  | 1315.8                           | 18.25 |
|                                                          | Agra ..            | 1,069                    | 1,076                   | 8              | 1006                         | 7.48  | 1250.3                           | 17.76 |
|                                                          | Muttra ..          | 341                      | 376                     | 10             | 1102                         | 29.32 | 1090.0                           | 16.46 |
|                                                          | Delhi ..           | 554                      | 854                     | 8              | 1541                         | 14.44 | 1963.5                           | 29.90 |
|                                                          | Roorkee ..         | 369                      | 408                     | 5              | 1136                         | 13.92 | 1402.4                           | 21.60 |
|                                                          | Chakrata ..        | 737                      | 387                     | 7              | 525                          | 9.49  | *794.4                           | 9.58  |
| Sirhind ..                                               | Umballa ..         | 1,249                    | 1,768                   | 13             | 1415                         | 10.40 | 1377.8                           | 17.49 |
|                                                          | Jullundur ..       | 835                      | 1,085                   | 9              | 2017                         | 10.77 | 1481.0                           | 21.32 |
|                                                          | Subathu ..         | 733                      | 686                     | 9              | 935                          | 12.27 | 1055.2                           | 16.70 |
|                                                          | Dagahai ..         | 738                      | 746                     | 6              | 1010                         | 8.13  | 931.3                            | 10.44 |
|                                                          | Jutogh..           | 62                       | 63                      | 1              | 1013                         | 16.12 | *728.0                           | 15.66 |
|                                                          | Solun ..           | 160                      | 124                     | 1              | 775                          | 6.25  | †1370.0                          | 18.35 |
| Lahore ..                                                | Meen Meer ..       | 886                      | 2,265                   | 17             | 2556                         | 19.18 | 2344.6                           | 40.59 |
|                                                          | Fort Lahore ..     | 152                      | 322                     | 5              | 2118                         | 32.89 | †2463.3                          | 33.69 |
|                                                          | Amritsar ..        | 232                      | 683                     | 1              | 2943                         | 4.31  | *1860.0                          | 40.36 |
|                                                          | Fort Govindgarh .. | 90                       | 222                     | 1              | 2466                         | 11.11 | *1630.9                          | 17.38 |
|                                                          | Ferozepore ..      | 1,064                    | 1,958                   | 17             | 1840                         | 15.97 | 1301.2                           | 16.50 |
|                                                          | Mooltan ..         | 743                      | 1,562                   | 8              | 2102                         | 10.76 | 1412.4                           | 16.44 |
|                                                          | Fort Kangra ..     | 52                       | 146                     | 2              | 2807                         | 38.46 | †1190.0                          | 16.02 |
|                                                          | Bhagsu ..          | 64                       | 50                      | 1              | 781                          | 15.62 | †1100.7                          | 10.94 |
|                                                          | Banikhet ..        | 61                       | 50                      | ..             | 819                          | ..    | §1029.0                          | 4.83  |
|                                                          | Dalhousie ..       | 29                       | 43                      | 1              | 1482                         | 34.48 | 955.8                            | 63.19 |
| Rawal Pindi                                              | Rawal Pindi ..     | 1,479                    | 2,017                   | 16             | 1363                         | 10.81 | 1467.6                           | 13.75 |
|                                                          | Sialkot ..         | 1,089                    | 1,810                   | 19             | 1662                         | 17.44 | 1376.7                           | 13.69 |
|                                                          | Campbellpore ..    | 98                       | 135                     | 3              | 1377                         | 30.61 | 1310.6                           | 14.45 |
|                                                          | Fort Attock ..     | 202                      | 395                     | 5              | 1955                         | 24.75 | 2142.2                           | 20.69 |
|                                                          | Dera Ismail Khan } | 102                      | 187                     | 1              | 1833                         | 9.80  | 1751.8                           | 15.08 |
|                                                          | Kooldunnah ..      | 118                      | 179                     | 1              | 1516                         | 8.47  | §888.8                           | 6.32  |
|                                                          | Khyra Gully ..     | 51                       | 68                      | 1              | 1333                         | 19.60 | §1125.8                          | 6.29  |
|                                                          | Bara Gully ..      | 103                      | 200                     | ..             | 1851                         | ..    | §1033.9                          | 20.14 |
|                                                          | Chungla Gully ..   | 93                       | 142                     | 1              | 1526                         | 10.75 | §1066.4                          | 13.29 |
|                                                          | Kalabagh ..        | 107                      | 263                     | 2              | 2457                         | 18.69 | §1723.4                          | 6.08  |
|                                                          | Camp Ghareal ..    | 145                      | 144                     | 11             | 993                          | 75.86 | **561.4                          | 3.51  |
|                                                          |                    |                          |                         |                |                              |       |                                  |       |
| Peshawar..                                               | Peshawar ..        | 1,696                    | 2,980                   | 53             | 1757                         | 31.25 | 2653.4                           | 43.70 |
|                                                          | Nowshera ..        | 362                      | 706                     | 9              | 1950                         | 24.86 | 2282.0                           | 19.07 |
|                                                          | Cherat..           | 411                      | 754                     | 8              | 1834                         | 19.46 | 1439.7                           | 20.91 |
| Camps of Exercise, &c.                                   |                    | 872                      | 733                     | 3              | 841                          | 3.44  | ..                               | ..    |
| Troops on the March..                                    |                    | 1,275                    | 1,334                   | 4              | 1046                         | 3.13  | ..                               | ..    |
| ,, treated at Convalescent Depôts and other Hospitals .. |                    | 2,238                    | 3,172                   | 90             | 1386                         | 39.33 | ..                               | ..    |

\* 7 years only.

† 8 years only.

‡ 6 years only.

§ 3 years only.

|| 4 years only.

¶ 2 years only.

\*\* 5 years only.

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Although cholera was epidemic amongst the troops at Pesbawar, there is a reduction of 1467 per 1,000 men in the rate of admissions on that of the preceding year, a result due to the diminished prevalence of paroxysmal fevers. Excluding stations, the average strength at which was not equal to that of a regiment, the highest rate of admissions for sickness in the present year is that for the station of Meen Meer, which exceeds the average rate of the Command by 1143 per 1,000 men, and which is also 83 per 1,000 higher than its own rate for 1875. The great prevalence of ague throughout the year (and in every corps stationed at Meen Meer) caused the very high admission-rate. Of stations having lower rates of admissions than in the preceding year, the most noticeable is that of Calcutta, and it is so, not on account of the importance of the decrease (29 per 1,000 men), as of the fact that there has been a progressive diminution in the admission-rate of this station for several years, in the present year it is conspicuously low, the death-rate of the station is also very favourable. There are 13 stations, the admissions at each of which are less than the average annual strength; all the stations in the Rohilcound Division are in this category.

The admissions and deaths in the different classes and orders of diseases in each of the Military Divisions, are shown in the following Table:—

| Divisions ... ..             |                      |       |     | Peshawar District. |       | Camp of Exercise and Delhi Camp. |     | Troops on the March. |       | Convalescent Depôts. |       |       |  |
|------------------------------|----------------------|-------|-----|--------------------|-------|----------------------------------|-----|----------------------|-------|----------------------|-------|-------|--|
| Strength, Average annual ... |                      |       |     | 510                |       | 2,384                            |     | 829                  |       | 1,893                |       | 1,692 |  |
| Order.                       | Class of Diseases.   |       |     | Died.              |       | Admitted.                        |     | Died.                |       | Admitted.            |       | Died. |  |
|                              |                      |       |     |                    |       |                                  |     |                      |       |                      |       |       |  |
| I. General Diseases.         |                      |       |     |                    |       |                                  |     |                      |       |                      |       |       |  |
| 1                            | Febrile              | Group | ... | 28                 | 2,564 | 47                               | 199 | 1                    | 493   | ...                  | 843   | 19    |  |
| 2                            | Constitutional       | „     | ... | 6                  | 341   | 2                                | 138 | ...                  | 228   | ...                  | 348   | 9     |  |
| II. Local Diseases.          |                      |       |     |                    |       |                                  |     |                      |       |                      |       |       |  |
| Diseases of the—             |                      |       |     |                    |       |                                  |     |                      |       |                      |       |       |  |
| 1                            | Nervous System       | ...   | ... | 10                 | 94    | 10                               | 5   | ...                  | 22    | 1                    | 51    | 3     |  |
| 2                            | Eye                  | ...   | ... | ...                | 36    | ...                              | 10  | ...                  | 13    | ...                  | 18    | ...   |  |
| 3                            | Ear                  | ...   | ... | ...                | 9     | ...                              | ... | ...                  | ...   | ...                  | 12    | ...   |  |
| 4                            | Nose                 | ...   | ... | ...                | 2     | ...                              | ... | ...                  | 2     | ...                  | ...   | ...   |  |
| 5                            | Circulatory System   | ...   | ... | 3                  | 84    | 3                                | 5   | ...                  | 10    | ...                  | 61    | 1     |  |
| 6                            | Absorbent            | „     | ... | ...                | 17    | ...                              | 19  | ...                  | 25    | ...                  | 31    | ...   |  |
| 7                            | Ductless Glands      | ...   | ... | ...                | ...   | ...                              | ... | ...                  | ...   | ...                  | ...   | ...   |  |
| 8                            | Respiratory System   | ...   | ... | 3                  | 133   | 1                                | 84  | 1                    | 82    | 2                    | 134   | 3     |  |
| 9                            | Digestive            | „     | ... | 7                  | 614   | 7                                | 116 | ...                  | 173   | ...                  | 526   | 8     |  |
| 10                           | Urinary              | „     | ... | 1                  | 188   | ...                              | 98  | ...                  | 205   | ...                  | 167   | 1     |  |
| 11                           | Generative           | „     | ... | ...                | 42    | ...                              | 13  | ...                  | 23    | ...                  | 19    | ...   |  |
| 12                           | Organs of Locomotion | ...   | ... | ...                | 4     | ...                              | 7   | ...                  | 9     | ...                  | 9     | ...   |  |
| 13                           | Cellular Tissue      | ...   | ... | ...                | 22    | ...                              | 11  | ...                  | 11    | ...                  | 22    | ...   |  |
| 14                           | Cutaneous System     | ...   | ... | ...                | 99    | ...                              | 29  | ...                  | 41    | ...                  | 85    | ...   |  |
| III. Conditions, &c.         |                      |       |     |                    |       |                                  |     |                      |       |                      |       |       |  |
| Debility                     |                      |       |     | ...                | 77    | ...                              | 3   | ...                  | 16    | ...                  | 46    | ...   |  |
| IV. Poisons                  |                      |       |     | ...                | 11    | 1                                | ... | ...                  | 2     | ...                  | 4     | ...   |  |
| V. Injuries.                 |                      |       |     |                    |       |                                  |     |                      |       |                      |       |       |  |
| 2                            | Accidental           | ...   | ... | 4                  | 178   | ...                              | 61  | 1                    | 125   | 1                    | 107   | ...   |  |
| 3                            | Homicidal            | ...   | ... | ...                | 1     | 1                                | ... | ...                  | ...   | ...                  | ...   | ...   |  |
| 4                            | Self-Inflicted       | ...   | ... | 2                  | 1     | ...                              | ... | ...                  | ...   | ...                  | 1     | ...   |  |
| 6                            | Judicial             | ...   | ... | ...                | ...   | ...                              | ... | ...                  | ...   | ...                  | ...   | ...   |  |
| VI. Surgical Operations      |                      |       |     | ...                | 2     | ...                              | ... | ...                  | ...   | ...                  | 3     | ...   |  |
| No appreciable disease       |                      |       |     | ...                | 6     | ...                              | ... | ...                  | 1     | ...                  | 4     | ...   |  |
| Total                        |                      |       |     | 264                | 4,525 | 72                               | 798 | 3                    | 1,481 | 4                    | 2,491 | 44    |  |

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## Strength

Bengal

| Strength | Bengal Division. |       | Lahore Division. |       | Rawal Pindi Division. |       | Peshawar District. |       | Camp of Exercise and Delhi Camp. |       | Troops on March. |       | Convalescent Depôts. |       |
|----------|------------------|-------|------------------|-------|-----------------------|-------|--------------------|-------|----------------------------------|-------|------------------|-------|----------------------|-------|
|          | Admitted.        | Died. | Admitted.        | Died. | Admitted.             | Died. | Admitted.          | Died. | Admitted.                        | Died. | Admitted.        | Died. | Admitted.            | Died. |
| 2-89     | 567-77           | 2-55  | 1330-71          | 4-54  | 669-80                | 7-98  | 1075-50            | 19-71 | 240-05                           | 1-20  | 260-43           | ...   | 498-23               | 11-23 |
| 1-56     | 176-50           | ...   | 125-68           | 2-42  | 137-32                | 1-71  | 143-04             | 84    | 166-47                           | ...   | 120-44           | ...   | 205-67               | 5-32  |
| 3-55     | 15-28            | 1-53  | 25-74            | 2-12  | 27-63                 | 2-85  | 39-43              | 4-19  | 6-03                             | ...   | 11-62            | 53    | 30-14                | 1-77  |
| ...      | 15-28            | ...   | 14-54            | ...   | 27-35                 | ...   | 15-10              | ...   | 12-06                            | ...   | 6-87             | ...   | 10-64                | ...   |
| ...      | 5-86             | ...   | 12-42            | ...   | 6-27                  | ...   | 3-77               | ...   | ...                              | ...   | ...              | ...   | 7-09                 | ...   |
| ...      | 25               | ...   | 2-42             | ...   | 57                    | ...   | 84                 | ...   | ...                              | ...   | 1-06             | ...   | ...                  | ...   |
| 1-33     | 30-05            | 2-29  | 14-54            | 91    | 30-48                 | 85    | 35-23              | 1-26  | 6-03                             | ...   | 5-28             | ...   | 36-05                | 59    |
| ...      | 7-13             | ...   | 14-54            | ...   | 10-26                 | ...   | 7-13               | ...   | 22-92                            | ...   | 13-21            | ...   | 18-32                | ...   |
| ...      | 51               | ...   | ...              | ...   | ...                   | ...   | ...                | ...   | ...                              | ...   | ...              | ...   | ...                  | ...   |
| 3-67     | 44-83            | 1-02  | 71-77            | 1-21  | 92-31                 | 85    | 55-79              | 42    | 101-33                           | 1-20  | 43-32            | 1-05  | 79-20                | 1-77  |
| 2-4-22   | 191-03           | 2-55  | 221-68           | 3-33  | 240-46                | 1-99  | 257-55             | 2-94  | 139-93                           | ...   | 91-39            | ...   | 310-88               | 4-73  |
| 7-22     | 102-14           | 51    | 90-85            | ...   | 89-17                 | 28    | 78-86              | ...   | 118-21                           | ...   | 108-29           | ...   | 98-70                | 59    |
| 3-...    | 11-72            | ...   | 9-09             | ...   | 11-97                 | ...   | 17-62              | ...   | 15-68                            | ...   | 12-15            | ...   | 11-23                | ...   |
| 9-22     | 3-82             | ...   | 6-66             | ...   | 4-56                  | ...   | 1-68               | ...   | 8-44                             | ...   | 4-75             | ...   | 5-32                 | ...   |
| 0-...    | 11-97            | ...   | 9-69             | ...   | 14-24                 | ...   | 9-23               | ...   | 13-27                            | ...   | 5-81             | ...   | 13-00                | ...   |
| 6-...    | 62-15            | ...   | 91-16            | ...   | 69-51                 | ...   | 41-53              | ...   | 34-98                            | ...   | 21-66            | ...   | 50-24                | ...   |
| 5-...    | 10-44            | ...   | 57-84            | ...   | 33-90                 | ...   | 32-30              | ...   | 3-62                             | ...   | 8-45             | ...   | 27-19                | ...   |
| 3-...    | 2-55             | ...   | 6-06             | 30    | 6-27                  | ...   | 4-61               | 42    | ...                              | ...   | 1-06             | ...   | 2-36                 | ...   |
| 9-22     | 107-49           | ...   | 104-78           | 1-21  | 145-87                | 1-14  | 74-66              | ...   | 73-58                            | 1-20  | 66-03            | 53    | 63-24                | ...   |
| ...      | ...              | ...   | ...              | ...   | ...                   | ...   | 42                 | 42    | ...                              | ...   | ...              | ...   | ...                  | ...   |
| 7-1-11   | 51               | 25    | ...              | 61    | ...                   | 57    | 42                 | ...   | ...                              | ...   | ...              | ...   | 59                   | ...   |
| ...      | ...              | ...   | ...              | ...   | 57                    | ...   | ...                | ...   | ...                              | ...   | ...              | ...   | ...                  | ...   |
| ...      | 61               | ...   | 1-21             | ...   | 57                    | ...   | 84                 | ...   | ...                              | ...   | ...              | ...   | 1-77                 | ...   |
| 2-...    | 25               | ...   | 61               | ...   | 57                    | ...   | 2-52               | ...   | ...                              | ...   | 53               | ...   | 2-36                 | ...   |
| 3-15-99  | 1367-04          | 10-70 | 2211-99          | 16-65 | 1619-65               | 18-22 | 1898-07            | 30-20 | 962-60                           | 3-60  | 782-35           | 2-11  | 1472-22              | 26-00 |

## GENERAL DISEASES.

| Divisions ... ..        | Presidency. | Allanabad. | Oudh.     | Rohilkund. | Sangor.   | Gwalior.  | Meerut.   | Sirhind.  | Lahore.   | Rawal Pindl. | Peshawar. | Camp of Exercise and Delhi Camp. | Troops on March. | Convalescent Depots. |
|-------------------------|-------------|------------|-----------|------------|-----------|-----------|-----------|-----------|-----------|--------------|-----------|----------------------------------|------------------|----------------------|
| Average Strength ...    | 2,118       | 3,089      | 3,889     | 2,747      | 1,176     | 1,754     | 4,501     | 3,926     | 3,302     | 3,510        | 2,384     | 829                              | 1,893            | 1,692                |
| General Diseases.       | Admitted.   | Admitted.  | Admitted. | Admitted.  | Admitted. | Admitted. | Admitted. | Admitted. | Admitted. | Admitted.    | Admitted. | Admitted.                        | Admitted.        | Admitted.            |
| <i>Febrile—</i>         | Died.       | Died.      | Died.     | Died.      | Died.     | Died.     | Died.     | Died.     | Died.     | Died.        | Died.     | Died.                            | Died.            | Died.                |
| Eruptive Fevers ..      | 4           | 48         | 583       | 3          | 2         | ...       | 3         | 55        | 2         | 1            | 2         | ...                              | ...              | 1                    |
| Continued " ..          | 463         | 429        | 692       | 208        | 42        | 135       | 356       | 742       | 697       | 561          | 901       | 33                               | 104              | 208                  |
| Paroxysmal " ..         | 644         | 762        | 446       | 304        | 780       | 1,062     | 1,466     | 1,425     | 3,665     | 1,755        | 1,598     | 165                              | 387              | 609                  |
| Cholera ..              | 5           | 24         | 11        | 9          | 7         | ...       | 2         | ...       | 3         | 29           | 57        | ...                              | ...              | 20                   |
| Influenza ..            | ...         | 8          | ...       | 1          | 1         | ...       | 1         | ...       | 5         | 1            | ...       | ...                              | ...              | 18                   |
| Erysipelas ..           | 2           | 5          | 4         | ...        | ...       | 3         | 8         | 1         | 17        | 4            | 4         | 1                                | ...              | ...                  |
| Other diseases ..       | 6           | 1          | ...       | 1          | ...       | 1         | 3         | ...       | 5         | ...          | 2         | ...                              | 1                | 5                    |
| Total ..                | 1,124       | 1,275      | 1,736     | 527        | 780       | 1,196     | 1,839     | 2,229     | 4,394     | 2,351        | 2,564     | 199                              | 493              | 843                  |
| <i>Constitutional—</i>  |             |            |           |            |           |           |           |           |           |              |           |                                  |                  |                      |
| Rheumatism ..           | 70          | 164        | 170       | 106        | 37        | 82        | 164       | 240       | 178       | 235          | 197       | 28                               | 70               | 132                  |
| Syphilis ..             | 115         | 415        | 534       | 162        | 75        | 82        | 277       | 410       | 181       | 191          | 98        | 110                              | 143              | 149                  |
| Scrofula, Phthisis, &c. | 27          | 25         | 40        | 6          | 10        | 8         | 27        | 34        | 13        | 33           | 32        | ...                              | 9                | 41                   |
| Scurvy and Purpura      | ...         | 4          | ...       | ...        | ...       | ...       | 1         | ...       | 1         | 4            | ...       | ...                              | ...              | ...                  |
| Anemia ..               | 2           | 8          | 4         | 7          | ...       | 3         | 24        | 5         | 36        | 16           | 12        | ...                              | 3                | 26                   |
| Other diseases ..       | 2           | 1          | 1         | ...        | 2         | 2         | ...       | ...       | 6         | 3            | 2         | ...                              | 3                | ...                  |
| Total ..                | 216         | 617        | 748       | 301        | 124       | 177       | 493       | 768       | 415       | 482          | 341       | 138                              | 228              | 349                  |

Bengal.

Ratio per 1,000 of Mean Strength.

| Divisions               | Presidency. | Allahabad.  | Oudh.       | Bohlicund. | Saugor.    | Gwalior.    | Meerut.     | Sirhind. | Lahore.     | Rawal Pindl. | Peshawar.    | Camp of Exercise and Delhi Camp. |             | Troops on March. |             | Convalescent Depots. |           |
|-------------------------|-------------|-------------|-------------|------------|------------|-------------|-------------|----------|-------------|--------------|--------------|----------------------------------|-------------|------------------|-------------|----------------------|-----------|
|                         | Admitted.   | Died.       | Admitted.   | Died.      | Admitted.  | Died.       | Admitted.   | Died.    | Admitted.   | Died.        | Admitted.    | Died.                            | Admitted.   | Died.            | Admitted.   | Died.                | Admitted. |
| General Diseases.       |             |             |             |            |            |             |             |          |             |              |              |                                  |             |                  |             |                      |           |
| Febrile—                |             |             |             |            |            |             |             |          |             |              |              |                                  |             |                  |             |                      |           |
| Eruptive Fevers         | 1-90        | 15-14       | 151-08      | 1-09       | 1-70       | ...         | 67          | 14-01    | 61          | 28           | 84           | ...                              | ...         | ...              | ...         | 59                   | ...       |
| Continued "             | 218-60      | 1-42 141-16 | 99-179-32   | 4-66       | 75-72 1-82 | 35-71 1-70  | 76-97       | 1-71     | 79-07 1-66  | 189-00 2-04  | 211-08 3-02  | 159-83 1-14                      | 377-93 2-10 | 39-81 1-21       | 54-94       | 122-93               | 59        |
| Paroxysmal "            | 304-06      | 250-74      | 115-57      | 78         | 110-66     | 38-620-75   | 85-599-77   | ...      | 325-63      | 44-302-97    | 51           | 1109-93                          | 61          | 500-00           | 85          | 670-30               | 359-93    |
| Cholera                 | 2-36 2-36   | 7-90        | 4-60        | 2-85       | 2-33       | 2-45 1-09   | 4-25        | 85       | ...         | 44           | 44           | ...                              | 91          | 61               | 8-26 5-98   | 23-91                | 16-36     |
| Influenza               | ...         | 2-63        | ...         | 36         | ...        | 85          | ...         | ...      | ...         | 1-51         | ...          | 28                               | ...         | ...              | ...         | ...                  | ...       |
| Erysipelas              | 94          | 1-64        | 1-04        | 1-09       | ...        | 1-71        | 1-78        | 26       | 5-15        | 1-14         | 1-68         | 1-21                             | ...         | 53               | ...         | 2-96                 | ...       |
| Other diseases          | 2-83        | 33          | ...         | 36         | 36         | 57          | 67          | 44       | 1-51        | 30           | 84           | 42                               | ...         | 53               | ...         | ...                  | ...       |
| Total                   | 530-69      | 3-78 419-64 | 5-59 449-86 | 7-77       | 191-83     | 3-63 663-26 | 3-40 681-87 | 1-71     | 408-48 2-88 | 567-77 2-55  | 1330-70 4-54 | 669-79 7-97                      | 1075-50     | 19-72 240-05     | 1-21 260-43 | 498-23               | 11-23     |
| Constitutional—         |             |             |             |            |            |             |             |          |             |              |              |                                  |             |                  |             |                      |           |
| Rheumatism              | 33-06       | 53-96       | 44-05       | 38-09      | 31-46      | 46-75       | 36-43       | 61-18    | 53-91       | 66-95        | 82-64        | 33-78                            | ...         | 36-98            | ...         | 78-01                | ...       |
| Syphilis                | 54-30       | 136-56      | 33-138-38   | 58-97      | 63-72      | 46-75       | 61-03       | 104-43   | 54-81       | 54-42        | 41-11        | 132-69                           | ...         | 75-54            | ...         | 88-06                | 1-77      |
| Scrofula, Phthisis, &c. | 17-75       | 1-89        | 8-23        | 66         | 10-36      | 1-55        | 9-46        | 1-09     | 8-50        | 4-06         | 57           | 6-00                             | 1-33        | 8-66             | ...         | 4-76                 | 3-55      |
| Scurvy and Purpura      | ...         | 1-82        | ...         | ...        | ...        | ...         | ...         | ...      | 30          | 1-14         | ...          | ...                              | ...         | ...              | ...         | ...                  | ...       |
| Anæmia                  | 94          | 2-63        | 33          | 2-55       | ...        | 1-71        | 5-33        | 1-27     | 10-90       | 91           | 5-03         | ...                              | ...         | 1-58             | ...         | 15-37                | ...       |
| Other diseases          | 94          | 47          | 28          | ...        | 1-70       | 1-14        | ...         | 22       | 1-82        | 61           | 84           | 42                               | ...         | 1-58             | ...         | ...                  | ...       |
| Total                   | 106-98      | 2-36 203-03 | 1-32 193-83 | 1-81       | 109-57     | 1-09 105-44 | 100-91      | 57       | 109-51      | 1-56 175-49  | 125-68 2-43  | 137-32 1-71                      | 143-04      | 84               | 166-47      | 205-67               | 5-32      |



The rate of admissions for *General Diseases*, is higher than in the preceding *Bengal*. year for every Division excepting Rohilcund, Meerut, and Peshawar, which show reductions of 38·9, of 100·4, and of 896·9 per 1,000 men respectively. The increase in the instance of the Presidency is 268·7, of Allahabad 93·7, of Oudh 168·1, of Saugor 91·1, of Gwalior 161·4, of Sirhind 172·6, of Lahore 324·2, and of Rawal Pindi 351· per 1,000 of the strength. An increased rate is also shown for Troops Marching, and for Camps of Exercise. For diseases of the *febrile group*, every Division shows an increase on the rate of 1875 except Peshawar, in which there is a very large decrease—927·8 per 1,000 men. For diseases of the *constitutional group*, every Division shows a decreased rate of admissions excepting the Presidency, Saugor, and Rawal Pindi. No uniform correspondence is seen between the results as regards the mortality from diseases in this class in the various Divisions, and those relating to its proportional prevalence, increased rates of prevalence, and increased rates of mortality, are associated in some, whilst in others with increased rates of prevalence, there are lower rates of mortality. The disturbing influence of invaliding, upsets conclusions drawn from the fact of mortality, considered alone.

*Eruptive Fevers*.—The relative infrequency of fevers of the eruptive kind in adults in India as elsewhere, usually makes a record of the number of instances in which fevers of this group have attacked soldiers, little more than a formal acknowledgment of the importance of uniformity in statistical data, year after year; in the present year however the attacks of eruptive fevers have been considerable in point of number, owing to the reappearance of one form of them, which is ordinarily seen only at long intervals. The epidemic of dengue fever which disease (of late years) appeared first amongst the troops in the Bengal Command in 1872, and then caused 4,026 admissions into hospital, which in 1873 caused 43, 45 in 1874, and 43 in 1875, in the present year again assumed epidemic proportions and gave 668 admissions. The disease appeared in three of the Divisions only, the Allahabad, the Oudh, and the Sirhind, but with very unequal intensity in those Divisions, thus whilst the rate of admissions for eruptive fevers is greater in the Allahabad than in 1875 by a fraction only, it is greater by 151· per 1,000 men in the Oudh, and by 13·5 in the Sirhind. In each of the Divisions named it appeared at one station only, namely at Allahabad, at Lucknow, and at Umballa. At Allahabad, the disease was confined to one corps there, the 1st Battalion 5th Foot, but at Lucknow every corps in the garrison suffered, at Umballa it was nearly confined to the 1st Battalion 12th Foot, only 4 admissions for it took place in all the other corps in the garrison. There were no admissions for dengue in the first quarter of the year, 40 occurred in the second quarter, 190 in the third quarter, and 438 in the last quarter, a sequence which would appear to indicate that the epidemic was increasing both in intensity, and in area of diffusion.

*Continued Fevers*.—The rate of admissions for fevers of this nature is higher than in the preceding year for the Presidency, Allahabad, Oudh, Gwalior, Meerut, Sirhind, and Lahore Divisions, but is lower for the remaining ones, the increase is greatest in the Lahore Division, 101·9 per 1,000 men, being nearly double the rate of 1875, it is also large in the Oudh, and in the Sirhind Divisions, 77·2 and 59· per 1,000 men respectively. In those Divisions in which there is a lower rate of prevalence of continued fevers, the decrease is trifling in the instances of Saugor, and of Rawal Pindi, but is very large in that of Peshawar, 259·9 per 1,000 men, or considerably more than a third. With higher rates of prevalence, the rates of mortality are lower in the instances of the Allahabad, Rohilcund, and Sirhind Divisions, and higher in those of the Presidency, Oudh, Gwalior, Lahore and Meerut Divisions; a lower rate of prevalence, and a higher rate of mortality are associated in the Saugor, whilst in the Rawal Pindi, and the Peshawar Divisions, lower rates of prevalence, and lower rates of mortality are found together.

*Enteric Fever*.—For all the Divisions the rate of admissions for this disease is 479, and the rate of deaths is 175 per 1,000 men; compared with the preceding year these results show an increase of 1·93 per 1,000 men in the admission-rate, and of ·22 per 1,000 in the death-rate; as the rate of mortality for cases treated however is only 365·2 per 1,000 of attacks, or 171·8 lower than in 1875, there is reason to believe that the greater prevalence of enteric fever in the present year may be apparent only, the result of a more exact discrimination between this, and other forms of fever.

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In the following Table, the data in which have been taken from the Quarterly Returns of the Command, the stations at which admissions and deaths from enteric fever took place are shown :—

| Divisions.    | Stations.                           | 1st Quarter. |         | 2nd Quarter. |         | 3rd Quarter. |         | 4th Quarter. |         | Total.      |         |
|---------------|-------------------------------------|--------------|---------|--------------|---------|--------------|---------|--------------|---------|-------------|---------|
|               |                                     | Admissions.  | Deaths. | Admissions.  | Deaths. | Admissions.  | Deaths. | Admissions.  | Deaths. | Admissions. | Deaths. |
| Presidency .. | Dum-Dum ..                          | ..           | ..      | ..           | ..      | 1            | 1       | ..           | ..      | 1           | 1       |
|               | Barrackpore ..                      | 1            | ..      | ..           | ..      | 4            | 2       | ..           | ..      | 5           | 2       |
| Allahabad ..  | Allahabad ..                        | ..           | ..      | 2            | 2       | ..           | ..      | ..           | ..      | 2           | 2       |
|               | Dinapore ..                         | ..           | ..      | ..           | ..      | 2            | ..      | ..           | ..      | 2           | ..      |
|               | Benares ..                          | ..           | ..      | ..           | ..      | ..           | ..      | 2            | 1       | 2           | 1       |
| Oudh ..       | Lucknow ..                          | ..           | ..      | 11           | 3       | 3            | 2       | 5            | 1       | 19          | 6       |
|               | Fyzabad ..                          | ..           | ..      | 15           | 7       | 2            | 2       | 3            | 1       | 20          | 10      |
|               | Sitapore ..                         | 2            | ..      | 5            | ..      | 1            | 1       | ..           | 1       | 8           | 2       |
| Gwalior ..    | Morar ..                            | 1            | ..      | 1            | 1       | 2            | 1       | ..           | ..      | 4           | 2       |
|               | Fortress ..                         | ..           | ..      | 2            | 1       | 1            | ..      | 2            | ..      | 5           | 1       |
|               | Gwalior ..                          | ..           | ..      | ..           | ..      | ..           | ..      | ..           | ..      | ..          | ..      |
| Rohilkund ..  | Saugor ..                           | ..           | ..      | 1            | 1       | ..           | ..      | 1            | ..      | 2           | 1       |
|               | Nowgong ..                          | 1            | 1       | ..           | ..      | 3            | ..      | ..           | ..      | 4           | 1       |
|               | Bareilly ..                         | 2            | ..      | ..           | ..      | ..           | ..      | ..           | ..      | 2           | ..      |
|               | Shahjehanpore ..                    | ..           | ..      | ..           | ..      | 1            | 1       | 2            | 2       | 3           | 3       |
|               | Ranikhet ..                         | ..           | ..      | ..           | ..      | 2            | 1       | ..           | ..      | 2           | 1       |
| Meerut ..     | Meerut ..                           | ..           | ..      | ..           | ..      | 2            | 1       | 1            | 1       | 3           | 2       |
|               | Agra ..                             | ..           | ..      | ..           | ..      | ..           | ..      | 1            | 1       | 1           | 1       |
|               | Muttra ..                           | ..           | ..      | ..           | ..      | ..           | ..      | 1            | 1       | 1           | 1       |
|               | Delhi ..                            | ..           | 1       | 3            | 1       | ..           | ..      | ..           | ..      | 3           | 2       |
|               | Roorkee ..                          | ..           | ..      | ..           | ..      | 1            | 1       | ..           | ..      | 1           | 1       |
| Sirhind ..    | Umballa ..                          | 1            | ..      | ..           | ..      | 1            | 1       | 2            | ..      | 4           | 1       |
|               | Jullundur ..                        | 1            | ..      | 4            | 1       | 2            | 2       | ..           | ..      | 7           | 3       |
|               | Subathu ..                          | 2            | ..      | 1            | ..      | 1            | 1       | 3            | 1       | 7           | 2       |
|               | Dagshai ..                          | 2            | ..      | ..           | ..      | 3            | 2       | 1            | ..      | 6           | 2       |
| Lahore ..     | Meen Meer ..                        | ..           | ..      | 1            | ..      | ..           | ..      | 2            | ..      | 3           | ..      |
|               | Fort Lahore ..                      | ..           | ..      | 1            | ..      | 1            | ..      | 1            | ..      | 3           | ..      |
|               | Amritsar ..                         | ..           | ..      | 1            | ..      | ..           | ..      | ..           | ..      | 1           | ..      |
|               | Ferozepore ..                       | 17           | 5       | ..           | ..      | ..           | ..      | 1            | 1       | 18          | 6       |
|               | Mooltan ..                          | ..           | ..      | 1            | ..      | ..           | ..      | 1            | 1       | 2           | 1       |
| Rawal Pindi   | Rawal Pindi ..                      | 1            | ..      | ..           | ..      | 3            | ..      | ..           | ..      | 4           | ..      |
|               | Sialkot ..                          | 1            | 1       | 2            | 1       | 1            | 1       | ..           | ..      | 4           | 3       |
|               | Campbellpore ..                     | ..           | ..      | 2            | ..      | ..           | ..      | ..           | ..      | 2           | ..      |
|               | Khyra Gully ..                      | ..           | ..      | 1            | ..      | ..           | ..      | ..           | ..      | 1           | ..      |
|               | Bara ..                             | ..           | ..      | 1            | ..      | ..           | ..      | ..           | ..      | 1           | ..      |
|               | Dera Ismail Khan ..                 | ..           | ..      | ..           | ..      | ..           | ..      | 2            | ..      | 2           | ..      |
| Peshawar ..   | Peshawar ..                         | 3            | ..      | ..           | ..      | ..           | ..      | ..           | ..      | 3           | ..      |
|               | Cherat ..                           | ..           | ..      | 3            | ..      | 10           | 4       | ..           | ..      | 13          | 4       |
|               | Nowshera ..                         | 1            | 1       | ..           | ..      | ..           | ..      | ..           | ..      | 1           | 1       |
| Depôts ..     | Nynee Tal ..                        | ..           | ..      | 1            | ..      | ..           | ..      | ..           | ..      | 1           | ..      |
|               | Murree ..                           | ..           | ..      | 2            | 1       | ..           | ..      | ..           | ..      | 2           | 1       |
|               | Onthemarch, and Camp of Exercise .. | 3            | 1       | ..           | ..      | ..           | ..      | ..           | ..      | 3           | 1       |
|               | Total in the Command                | 39           | 10      | 61           | 19      | 47           | 24      | 31           | 12      | 178         | 65      |

Enteric fever was present at nearly all the stations at which it was seen in 1875, but usually in a sporadic form only, and attacking men living in different, perhaps widely separated parts of the same station; in other instances, as in that of Cherat, attacking several men of the same corps, and creating a condition for which the term epidemic is inapplicable only because of the small number of attacks in all. There were two instances in which the men of one corps were affected in considerable numbers, to the exclusion of men of other corps quartered at the same station, both of those "house epidemics" affected regiments newly arrived in India; the first in point of time was in the 34th Regiment at Ferozepore, in which it caused 17 admissions in January, the report received from this regiment does not enter into the subject of the outbreak. The epidemic in the 1st Battalion of the 25th Regiment, was a considerable one in point of magnitude—for, as will be shown, its extent is not to be estimated by the 17 admissions returned,—it is important from the relation which the facts observed in connexion with it have to a certain theory of the causation of enteric fever, and the Medical Officer who had charge during its course has given its history in a very clear and complete way; from his report the following particulars are summarised:—The regiment arrived in Bengal in November, 1875, in 1874 it was stationed at Kinsale, in the barracks of which place there have been outbreaks of enteric fever in recent times in two of the regiments occupying them, but it is expressly noticed that the health of the 25th when at Kinsale was good, that it was very healthy on the voyage, and that there is every reason to believe no case of the disease was brought by it to India. The regiment arrived at Fyzabad in the end of November, 1875, and was quartered in the lines vacated by the 51st Regiment, which corps during three successive years had suffered from outbreaks of enteric fever. The first recognised case in the epidemic in the 1st Battalion 25th Regiment was that of a soldier admitted into hospital on the 17th of April, and (excluding an instance in which a non-commissioned officer was attacked in October) the last was admitted on the 15th of June; the epidemic therefore apparently lasted for two months; the following extract from the report however makes it probable that it began at a time anterior to the admission of the first recorded case of the disease:—"When attention was aroused by the post mortem appearances in the case of Private —, the other cases of fever were closely scrutinised, and it was soon evident that his was not a solitary one of the disease; several presented symptoms of an unequivocal character. It was next noticed that nearly all these, and in addition other cases of great severity regarded as being of simple continued fever, came from the same part of the lines." The disease was very localised, more than two-thirds of the cases were received from the three contiguous bungalows Nos. 17, 18, and 19 (out of 24 occupied by the regiment), most of them from No. 19; these bungalows are at the north end of the lines, on ground of low elevation. Of the cases not received from the bungalows noted, one was that of a married man belonging to the company occupying No. 19, whose duties took him to it frequently; in respect of the other instances no evidence was obtained to show how they acquired their illnesses, whether in or out of what the Medical Officer calls "the infected area." He reverts to the subject of the extent of the prevalence of the fever, and states that "Side by side with the cases of enteric fever in the two months during which they occurred, were many of simple continued fever of a severe type, which were called so because they had not the enteric symptoms sufficiently marked to warrant their being regarded as instances of enteric fever. In G Company alone (that occupying No. 19 bungalow), 16 cases of this kind are noted which occurred synchronously with the enteric fever cases; they were characterised by persistent pyrexia, sometimes indeed hyperpyrexia, exhibiting the remissions and vacillations of a mild case of enteric fever, and as in that disease having long retarded convalescence; I append a number of the temperature charts of these cases. The cases (of simple continued fever) ceased when those of the specific fever ceased; I have no doubt that many of them were really cases of enteric fever." An examination of one of the charts referred to in the preceding extract, shows that on the day of admission there was a morning temperature of 100°, in the evening one of 101°9', that the difference between the morning and evening reading was usually about a

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degree and a half, that on the 6th day the evening temperature was 103·5°, on the 20th day 104·8°, and that defervescence did not set in steadily until the 76th day; further, it is remarked that the "bowels are irregular, but no "positive diarrhoea of any continuance." The man remained 106 days in hospital, and on his discharge, being still anæmic, he was sent to the hills.

The Medical Officer notes that the ground water at the beginning of the epidemic was at a low level, and was sinking steadily during its continuance.

With one exception all the persons attacked were young, that is, were under 24 years of age, and had only been a few months in India.

In seeking for the cause of this epidemic the Medical Officer, deciding against the likelihood of importation of the disease from without, considered how the facts in connexion with it bore on the well-known views of the causation of enteric fever in India, propounded by one whose unequalled knowledge of the whole subject of disease in that country, justly inclines opinion towards the acceptance of any view supported by his authority. The influence of excessive heat in developing the phenomena of enteric fever in the human body in the instances under notice is adverted to:—"The time of year (May "and June) when most of the cases occurred seems to favor this hypothesis; "but two circumstances in the outbreak are fatal to it, the first and chief "one being, the limited area in which the disease mostly acted, and the "second, the abrupt termination of the epidemic when the heat was at its "greatest; for manifestations so localised, it is manifest that local causes "must be sought . . ." The conditions which in the opinion of the Medical Officer adequately explained the occurrence of the epidemic, were those of a local poisoning through the medium of the well-water habitually used by the inmates of bungalows 17, 18, and 19, and the possible occasional use of which by individuals in the neighbouring bungalows, might be assumed. Though some of the links in the chain of evidence leading to this conclusion are weak, the force of what is established is almost decisive. Putting aside, as of itself inconclusive, the fact that the epidemic ceased soon after the well in question was shut up (No. 19 bungalow being vacated at the same time), there is evidence from chemical analysis of the suspicious character of the water of this particular well, and there is the presumption of its possible specific contamination by the invalids belonging to the 51st Regiment (in which enteric fever had prevailed) who for some time were quartered in 19 bungalow. The map appended to the report seems to show that the outbreak was due to a local poisoning.

*Simple Continued Fever, and Febricula.*—The proportions in which the prevalence of these two forms of fever varied from those of the preceding year in the different Divisions have substantially already been noted, when references were made to the prevalence of the group of continued fevers; one significant point in connexion with the mortality of simple continued fever is, that in the present year it is only one-fifth of the rate of 1875.

*Paroxysmal Fevers.*—The rate of prevalence is higher than for the preceding year in every Division, excepting Meerut, and Peshawar; in the instance of the Presidency the excess is 208·7 per 1,000 men, of Allahabad it is 92·1, of Oudh 29·5, of Rohileund 44·3, of Saugor 94·6, of Gwalior 193·1, of Sirhind 116·1, of Lahore 267·9, and of Rawal Pindi 351·5; for Meerut the rate is 113·1, and for Peshawar 687·8 per 1,000 men lower than in 1875. The nearly general rise in the rate of prevalence coupled with the magnitude of the excess in most cases, seems to indicate the presence of one of the periodical epidemics of fevers of this nature; for the want of conformity in the instance of Meerut, and still more in that of Peshawar, no explanation is apparent, it is not due in either instance to a transference to the class of continued fevers, and in the instance of Peshawar, the decrease seems to be too great to be accounted for by a shifting of corps.

*Cholera.*—In the first two months of the year, not a single admission for cholera took place in the Command, and in the following three months most of the few admissions, were those from troops stationed in that part of it in which the occurrence of a few sporadic cases of the disease is usual. At Dinapore, however in the third and fourth weeks of April, the six admissions which took place indicated the presence in the Command of cholera in an epidemic form. In the second, third, and fourth weeks of June, five admissions

took place at  
on the renewal  
epidemic cholera  
Pindi, and in the  
the first-named  
valescent Depot  
week in August  
In the Peshawar  
week of September  
of which 39 were  
station, but it is  
Artillery.

The admission  
in each week of

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| Lahore.      |     | Rawal Pindi. |     |           |     |                   |     |           |     |         |     | Peshawar.      |     | Total. |     |           |     |
|--------------|-----|--------------|-----|-----------|-----|-------------------|-----|-----------|-----|---------|-----|----------------|-----|--------|-----|-----------|-----|
| Fort Lahore. |     | Rawal Pindi. |     | Sialkote. |     | Dera Ismail Khan. |     | Kelabagh. |     | Murree. |     | Camp Gharaeal. |     |        |     | Peshawar. |     |
| A            | D   | A            | D   | A         | D   | A                 | D   | A         | D   | A       | D   | A              | D   | A      | D   | A         | D   |
| ...          | ... | ...          | ... | ...       | ... | ...               | ... | ...       | ... | ...     | ... | ...            | ... | ...    | ... | 1         | —   |
| ...          | ... | ...          | ... | ...       | ... | ...               | ... | ...       | ... | ...     | ... | ...            | ... | ...    | ... | 1         | 1   |
| ...          | ... | ...          | ... | ...       | ... | ...               | ... | ...       | ... | ...     | ... | ...            | ... | ...    | ... | ...       | ... |
| ...          | ... | ...          | ... | ...       | ... | ...               | ... | ...       | ... | ...     | ... | ...            | ... | ...    | ... | 2         | 2   |
| ...          | ... | ...          | ... | ...       | ... | ...               | ... | ...       | ... | ...     | ... | ...            | ... | ...    | ... | 2         | 2   |
| ...          | ... | ...          | ... | ...       | ... | ...               | ... | ...       | ... | ...     | ... | ...            | ... | ...    | ... | 1         | 1   |
| ...          | ... | ...          | ... | ...       | ... | ...               | ... | ...       | ... | ...     | ... | ...            | ... | ...    | ... | 6         | 2   |
| ...          | ... | ...          | ... | ...       | ... | ...               | ... | ...       | ... | ...     | ... | ...            | ... | ...    | ... | 1         | 1   |
| ...          | ... | ...          | ... | ...       | ... | ...               | ... | ...       | ... | ...     | ... | ...            | ... | ...    | ... | 1         | 2   |
| ...          | ... | ...          | ... | ...       | ... | ...               | ... | ...       | ... | ...     | ... | ...            | ... | ...    | ... | 1         | ... |
| ...          | ... | ...          | ... | ...       | ... | ...               | ... | ...       | ... | ...     | ... | ...            | ... | ...    | ... | 1         | 2   |
| ...          | ... | ...          | ... | ...       | ... | ...               | ... | ...       | ... | ...     | ... | ...            | ... | ...    | ... | 1         | 1   |
| ...          | ... | ...          | ... | ...       | ... | ...               | ... | ...       | ... | ...     | ... | ...            | ... | ...    | ... | 1         | 1   |
| ...          | ... | ...          | ... | ...       | ... | ...               | ... | ...       | ... | ...     | ... | ...            | ... | ...    | ... | 2         | 1   |
| ...          | ... | ...          | ... | ...       | ... | ...               | ... | ...       | ... | ...     | ... | ...            | ... | ...    | ... | 2         | 2   |
| ...          | ... | ...          | ... | ...       | ... | ...               | ... | ...       | ... | ...     | ... | ...            | ... | ...    | ... | 2         | ... |
| ...          | ... | ...          | ... | ...       | ... | ...               | ... | ...       | ... | ...     | ... | ...            | ... | ...    | ... | 2         | 2   |
| ...          | ... | ...          | ... | ...       | ... | ...               | ... | ...       | ... | ...     | ... | ...            | ... | ...    | ... | 2         | ... |
| ...          | ... | ...          | ... | ...       | ... | ...               | ... | ...       | ... | ...     | ... | ...            | ... | ...    | ... | ...       | ... |
| ...          | ... | ...          | ... | ...       | ... | ...               | ... | ...       | ... | 13      | 11  | ...            | ... | ...    | ... | 13        | 11  |
| ...          | ... | 2            | ... | ...       | ... | ...               | ... | ...       | ... | 6       | 6   | ...            | ... | ...    | ... | 15        | 8   |
| 1            | 1   | ...          | 2   | ...       | ... | ...               | ... | ...       | ... | ...     | ... | 3              | 1   | ...    | ... | 8         | 7   |
| 1            | 1   | 1            | ... | ...       | ... | ...               | ... | ...       | ... | ...     | ... | 9              | 6   | ...    | ... | 15        | 8   |
| ...          | ... | 1            | 1   | ...       | ... | ...               | ... | 1         | 1   | ...     | ... | 2              | 3   | ...    | ... | 7         | 7   |
| ...          | ... | ...          | ... | ...       | ... | ...               | ... | 1         | 1   | ...     | ... | ...            | ... | ...    | ... | 6         | 5   |
| ...          | ... | 2            | 2   | 3         | 2   | ...               | ... | ...       | ... | ...     | ... | ...            | ... | ...    | ... | 8         | 5   |
| ...          | ... | ...          | ... | 3         | 1   | ...               | ... | ...       | ... | ...     | ... | ...            | ... | ...    | ... | 4         | 2   |
| ...          | ... | ...          | ... | ...       | ... | ...               | ... | ...       | ... | ...     | ... | ...            | ... | ...    | ... | ...       | ... |
| ...          | ... | ...          | ... | ...       | ... | ...               | ... | ...       | ... | ...     | ... | ...            | ... | 14     | 3   | 15        | 3   |
| ...          | ... | ...          | ... | ...       | ... | ...               | ... | ...       | ... | ...     | ... | ...            | ... | 25     | 21  | 25        | 21  |
| ...          | ... | ...          | ... | ...       | ... | ...               | ... | ...       | ... | ...     | ... | ...            | ... | 19     | 13  | 19        | 13  |
| ...          | ... | ...          | ... | ...       | ... | ...               | ... | ...       | ... | ...     | ... | ...            | ... | ...    | 1   | ...       | 1   |
| ...          | ... | ...          | ... | ...       | ... | 1                 | 1   | ...       | ... | ...     | ... | ...            | ... | ...    | 1   | 1         | 2   |
| 2            | ... | 6            | ... | 6         | ... | 1                 | ... | 2         | ... | 19      | ... | 14             | ... | 58     | ... | 163       | ... |
| ...          | 2   | ...          | 5   | ...       | 3   | ...               | 1   | ...       | 2   | ...     | 17  | ...            | 10  | ...    | 39  | ...       | 116 |

*Rheumatism.*—The rate of admissions is lower for every Division except *Bengal*, the Presidency, the Oudh, and the Peshawar, for Sirhind the decrease is considerable, 39·5 per 1,000 men. The increase for Peshawar, amounts to 58·2.

*Syphilis.*—Compared with the preceding year the rate of admissions is higher for the Presidency (fractionally), Saugor, Sirhind (39·1 per 1,000 men), and Rawal Pindi, but is lower for each of the other Divisions, in the majority of instances the reduction is a considerable one.

*Scrophula, Phthisis, &c.*—Compared with the preceding year the rates of admissions are higher for the Presidency, Rohilcund, Meerut, Sirhind, Rawal Pindi, and Peshawar Divisions, but are lower for the others.

*Anæmia.*—Higher rates of admissions than in 1875, are shown for the Presidency, Allahabad, Rohilcund, Meerut, Rawal Pindi, and Peshawar Divisions; lower ones for the others.

*LOCAL DISEASES.—Diseases of the Nervous System.*—The rate of admissions is higher than in the preceding year for the Allahabad, Oudh, Saugor, Gwalior, Sirhind, and Peshawar Divisions, that of the last named being more than twice as high; the greater or lesser prevalence of neuralgia, determines the proportion of admissions for diseases of the order in the various Districts; as most of the deaths are due to sunstroke, the highest rates of mortality, do not correspond with the highest rates of prevalence of disease; there is an exception to this however in the instance of Peshawar, where the highest of both rates are associated; 10 deaths from sunstroke took place in this Division. One death (in the 51st Regiment) at Peshawar was due to hydrophobia.

*Diseases of the Eye.*—The rates of admission for diseases of this order are higher than in 1875 for the Presidency, Allahabad, and Rawal Pindi Divisions; the excess is not important in any instance, as the whole number of admissions is small.

*Diseases of the Circulatory System.*—The rates of admissions for diseases of this order in the Presidency, Allahabad, Saugor, Gwalior, Meerut, Rohilcund, and Lahore, are lower than in 1875; nearly three-fourths of the admissions were on account of palpitation.

*Diseases of the Respiratory System.*—Compared with the preceding year, the rates of admission are higher for the Presidency, Allahabad, Oudh, Saugor, Gwalior, and Sirhind Divisions, whilst they are lower for the remaining ones; the decrease amounts to 8·33 per 1,000 men for Rohilcund, to 5·09 for Lahore, to 44·7 for Rawal Pindi, and to 45 for Peshawar.

*Diseases of the Digestive System.*—The rate of prevalence of diseases in this order, is higher than for 1875, in the Presidency by 60·7, in the Allahabad by 46·7, in the Oudh by 22·6, in the Sirhind by 12·8, and in the Peshawar by 44·5 per 1,000 men; the rate is lower in the Rohilcund Division by 27·4 per 1,000 men, in the Saugor by 29·8, in the Gwalior by 53·8, in the Meerut by 26, and in the Lahore by 38·9. In the Rohilcund, and in Saugor, a higher rate of mortality, is in connexion with a lower rate of prevalence, but in the Gwalior, and in the Meerut Divisions, both rates are lower.

The relative prevalence of dyspepsia, dysentery, diarrhœa, and hepatitis, in the several Divisions, and the deaths due to them, are shown in the first of the following Tables, in the second the relation of the prevalence and of the mortality of the last three mentioned diseases are exhibited:—

Bengal.

|                | Hepatitis, including Abscess of the Liver. |       |                              |       | Dysentery. |       |                              |       | Diarrhoea. |       |                              |       | Total.    |       |                                     |       |
|----------------|--------------------------------------------|-------|------------------------------|-------|------------|-------|------------------------------|-------|------------|-------|------------------------------|-------|-----------|-------|-------------------------------------|-------|
|                | Number.                                    |       | Ratio per 1,000 of Strength. |       | Number.    |       | Ratio per 1,000 of Strength. |       | Number.    |       | Ratio per 1,000 of Strength. |       | Number.   |       | Annual Ratio per 1,000 of Strength. |       |
|                |                                            |       |                              |       |            |       |                              |       |            |       |                              |       |           |       |                                     |       |
|                | Admitted.                                  | Died. | Admitted.                    | Died. | Admitted.  | Died. | Admitted.                    | Died. | Admitted.  | Died. | Admitted.                    | Died. | Admitted. | Died. | Admitted.                           | Died. |
| Ist Quarter .. | 303                                        | 14    | 8.3                          | .38   | 163        | 2     | 4.4                          | .05   | 289        | 1     | 7.8                          | .03   | 760       | 17    | 20.5                                | .46   |
| IIrd " ..      | 421                                        | 16    | 11.4                         | .43   | 227        | 2     | 6.2                          | .06   | 404        | 1     | 11.0                         | .03   | 1,052     | 19    | 28.6                                | .52   |
| IIIrd " ..     | 521                                        | 18    | 14.2                         | .49   | 314        | 6     | 8.6                          | .17   | 675        | 1     | 18.5                         | .03   | 1,510     | 25    | 41.3                                | .68   |
| IVth " ..      | 448                                        | 24    | 12.3                         | .65   | 236        | 8     | 6.4                          | .22   | 396        | 1     | 10.8                         | .03   | 1,080     | 33    | 29.5                                | .90   |



Ratio per 1,000 of the Strength.

Bengal.

| Divisions.                           | Presidency. |       | Allahabad. |       | Oudh.     |       | Saugor.   |       | Rohilcund. |       | Gwalior.  |       | Meerut.   |       |
|--------------------------------------|-------------|-------|------------|-------|-----------|-------|-----------|-------|------------|-------|-----------|-------|-----------|-------|
| Diseases.                            | Admitted.   | Died. | Admitted.  | Died. | Admitted. | Died. | Admitted. | Died. | Admitted.  | Died. | Admitted. | Died. | Admitted. | Died. |
| Dysentery ...                        | 46·7        | ·94   | 46·4       | 1·32  | 27·6      | ·52   | 17·8      | ...   | 27·0       | 1·08  | 21·1      | ...   | 22·2      | ·44   |
| Diarrhoea ...                        | 53·3        | ...   | 61·8       | ·33   | 61·4      | ·26   | 26·3      | ...   | 43·0       | ·35   | 35·9      | ·57   | 43·3      | ...   |
| Hepatitis and Abscess of the Liver } | 46·7        | 1·88  | 32·5       | 2·96  | 54·9      | 1·57  | 29·7      | 1·70  | 30·3       | 1·44  | 45·6      | 1·14  | 58·0      | 3·33  |
| Total ...                            | 146·7       | 2·82  | 140·7      | 4·61  | 143·9     | 2·35  | 73·9      | 1·70  | 100·3      | 2·87  | 102·6     | 1·71  | 123·5     | 3·77  |
| Dyspepsia ...                        | 55·7        | ...   | 43·1       | ...   | 53·3      | ...   | 31·3      | ...   | 48·3       | ...   | 32·0      | ...   | 35·1      | ...   |

| Divisions.                           | Sirhind.  |       | Lahore.   |       | Rawal Pindi. |       | Peshawar. |       | Depôts.   |       | Troops on the March. |       | Camp of Exercise. |       |
|--------------------------------------|-----------|-------|-----------|-------|--------------|-------|-----------|-------|-----------|-------|----------------------|-------|-------------------|-------|
| Diseases.                            | Admitted. | Died. | Admitted. | Died. | Admitted.    | Died. | Admitted. | Died. | Admitted. | Died. | Admitted.            | Died. | Admitted.         | Died. |
| Dysentery ...                        | 21·6      | ·25   | 15·1      | ...   | 14·3         | ...   | 30·6      | ·34   | 26·6      | ·53   | 16·7                 | ...   | 24·2              | ...   |
| Diarrhoea ...                        | 42·5      | ...   | 50·0      | ·30   | 46·3         | ...   | 51·2      | ...   | 72·1      | ...   | 20·2                 | ...   | 49·5              | ...   |
| Hepatitis and Abscess of the Liver } | 31·4      | 2·04  | 36·9      | 2·73  | 46·7         | 1·43  | 65·0      | 1·68  | 70·3      | 2·01  | 17·3                 | ...   | 14·5              | ...   |
| Total ...                            | 95·5      | 2·29  | 102·0     | 3·03  | 107·3        | 1·43  | 146·8     | 2·52  | 169·0     | 2·54  | 54·2                 | ...   | 88·2              | ...   |
| Dyspepsia ...                        | 39·7      | ...   | 45·7      | ...   | 50·3         | ...   | 44·0      | ...   | 50·0      | ...   | 7·4                  | ...   | 16·0              | ...   |

*Diseases of the Urinary System.*—The rate of admissions for diseases of this order is higher than in 1875, in all the Divisions except Allahabad.

*Diseases of the Cutaneous System.*—The rate of admissions is higher than in 1875, in the Allahabad, Oudh, Saugor, and Lahore Divisions, but is lower in each of the others. There were only 16 admissions for "Delhi Boil."

*CONDITIONS, &c.—General Debility.*—The rate of admissions for this condition is higher for every division than in 1875, except for the Saugor, Gwalior, and Sirhind.

*Poisons*—Of the admissions in this order 43 were due to poisoning by alcohol, in two instances fatal, 42 to delirium tremens, four of the attacks being fatal, one to poisoning by decayed meat, and one to a snake bite.

The admissions and deaths in each corps which served in the Bengal Command, are shown in the following Table:—

Bengal.

| Regiments, &c.                       | Years of service in the Command. | Average Annual Strength. | Admitted into Hospital. | Deaths.   |              | Invalided. | Constantly Sick. | Ratio per 1,000 of Strength. |       |            |                  | Average Sick time to each Soldier. | Average duration of each case of Sickness. | Stations during the Year.                        |
|--------------------------------------|----------------------------------|--------------------------|-------------------------|-----------|--------------|------------|------------------|------------------------------|-------|------------|------------------|------------------------------------|--------------------------------------------|--------------------------------------------------|
|                                      |                                  |                          |                         |           |              |            |                  |                              |       |            |                  |                                    |                                            |                                                  |
|                                      |                                  |                          |                         | In India. | Of Invalids. |            |                  | Admitted.                    | Died. | Invalided. | Constantly Sick. |                                    |                                            |                                                  |
| 4th Hussars ..                       | 9                                | 435                      | 621                     | 5         | ..           | 19         | 21·97            | 1427·6                       | 11·50 | 43·68      | 50·51            | Days. 12·44                        | Days. 12·91                                | Rawal Pindi, 12 months; det. at Gharewal Camp.   |
| 9th Lancers ..                       | 1                                | 466                      | 799                     | 9         | ..           | 26         | 33·41            | 1714·6                       | 19·31 | 55·80      | 71·70            | 15·26                              | 15·26                                      | Sialkot, 12.                                     |
| 10th Hussars ..                      | 4                                | 458                      | 411                     | 10        | ..           | 17         | 24·87            | 897·4                        | 21·83 | 37·12      | 54·30            | 19·82                              | 22·09                                      | Camp of Exercise, 1½; Muttra, 10; Delhi, ½.      |
| 11th " ..                            | 10                               | 434                      | 403                     | 3         | ..           | 2          | 15·91            | 1135·9                       | 6·91  | 4·61       | 36·66            | 13·38                              | 11·79                                      | Camp of Exercise, 1½; Umballa, 10; Delhi, ½.     |
| 13th " ..                            | 3                                | 433                      | 678                     | 6         | 1            | 23         | 39·89            | 1565·8                       | 16·17 | 53·12      | 92·12            | 33·63                              | 21·48                                      | Camp of Exercise, ½; Lucknow, 11½.               |
| 15th " ..                            | 4                                | 463                      | 805                     | 7         | ..           | 24         | 26·74            | 1738·7                       | 15·12 | 51·84      | 57·75            | 21·08                              | 12·12                                      | Camp of Exercise, 1; Meerut, 10½; Delhi, ½.      |
| Total ..                             | ..                               | 2,689                    | 3,807                   | 40        | 1            | 111        | 162·79           | 1415·8                       | 15·25 | 41·28      | 60·52            | 22·10                              | 15·61                                      |                                                  |
| *Hd.-Qrs. and A Batt. A Brig. R.H.A. | 11                               | 162                      | 189                     | ..        | ..           | 2          | 6·90             | 1166·7                       | ..    | 12·34      | 42·59            | 15·55                              | 13·32                                      | Camp of Exercise, 1½; Umballa, 8½; on the March. |
| B Batt. " ..                         | 11                               | 139                      | 257                     | 1         | ..           | 5          | 7·78             | 1849·0                       | 7·19  | 35·97      | 55·97            | 20·43                              | 11·05                                      | Lucknow, 9½.                                     |
| C " " ..                             | 11                               | 149                      | 191                     | 2         | ..           | 3          | 8·03             | 1281·9                       | 13·42 | 20·13      | 53·89            | 19·72                              | 15·38                                      | Camp of Exercise, 1½; Umballa, 9; on the March.  |
| D " " ..                             | 11                               | 143                      | 187                     | 3         | ..           | 7          | 7·01             | 1307·7                       | 20·98 | 43·95      | 49·01            | 17·90                              | 13·67                                      | Camp of Exercise, ½; Meerut, 8½; on the March.   |
| E " " ..                             | 11                               | 123                      | 100                     | 1         | ..           | ..         | 2·76             | 813·0                        | 8·13  | ..         | 22·44            | 8·11                               | 10·07                                      | Morar, 10; on the March.                         |
| †Hd.-Qrs. and B Batt. B Brig. R.H.A. | ..                               | 18                       | 33                      | ..        | ..           | 2          | ·83              | 1833·3                       | ..    | ..         | 46·11            | 16·83                              | 9·18                                       | Umballa ½; on the March, ½.                      |
| ‡C Batt. B Brig. R.H.A.              | ..                               | 17                       | 32                      | 1         | ..           | ..         | ·69              | 1892·4                       | 58·82 | ..         | 40·59            | 14·81                              | 7·09                                       | Lucknow, 1 month; on the March, ½.               |
| ‡D " " "                             | ..                               | 17                       | 23                      | ..        | ..           | ..         | ·52              | 1352·9                       | ..    | ..         | 30·59            | 11·17                              | 8·25                                       | Meerut, 1; on the March.                         |

|                                       |     |     |     |    |    |    |       |        |        |       |       |       |       |                                                       |
|---------------------------------------|-----|-----|-----|----|----|----|-------|--------|--------|-------|-------|-------|-------|-------------------------------------------------------|
| A Batt. C Brig. R.H.A.                | 4   | 155 | 237 | 6  | .. | 10 | 8-87  | 1529-0 | 38-71  | 64-52 | 57-22 | 20-88 | 13-66 | Camp of Exercise, 1½; Meerut, 10; Delhi, 4.           |
| Inf.-Qrs. and B Batt. F Brig. R.H.A.  | 149 | 325 | 15  | 15 | .. | 7  | 7-60  | 2148-3 | 100-67 | 46-91 | 51-00 | 18-62 | 8-54  | Peshawar, 12.                                         |
| A Batt. "                             | 139 | 256 | 1   | 1  | .. | .. | 8-14  | 1841-7 | 7-19   | ..    | 58-56 | 21-38 | 11-61 | Meen Meer, 12.                                        |
| C " "                                 | 146 | 339 | ..  | .. | 12 | .. | 8-08  | 2321-9 | ..     | 82-20 | 55-34 | 20-20 | 8-70  | Sialkot, 12.                                          |
| E " "                                 | 148 | 173 | 5   | 5  | 5  | 5  | 5-32  | 1169-7 | 33-79  | 33-79 | 35-95 | 13-12 | 11-25 | Campbellpore, 8½; on the March.                       |
| F " "                                 | 142 | 157 | 1   | 1  | 5  | 5  | 4-92  | 1105-6 | 7-04   | 35-21 | 34-65 | 12-64 | 11-44 | Rawal Pindi, 9; Delhi, and on the March.              |
| 2nd Batt. 5th Brig. R.A.              | 9   | 14  | 29  | .. | 1  | 1  | 1-22  | 2071-4 | ..     | 71-42 | 87-14 | 31-81 | 15-36 | Detachment at Calcutta, 12.                           |
| Inf.-Qrs. and B Batt. 8th Brig. R.A.  | 153 | 200 | 5   | .. | 9  | 9  | 8-28  | 1307-2 | 32-68  | 58-82 | 54-12 | 19-75 | 15-10 | Camp of Exercise, 1; Meerut, 10½; Delhi, 4.           |
| A Batt. "                             | 149 | 265 | ..  | .. | 12 | 12 | 13-00 | 1778-5 | ..     | 80-54 | 87-25 | 31-85 | 17-91 | Camp of Exercise, and on the March, 2; Jullundur, 10. |
| C " "                                 | 147 | 482 | 4   | .. | 5  | 5  | 11-01 | 3279-0 | 27-21  | 34-01 | 74-90 | 27-34 | 8-34  | Mooltan, 12.                                          |
| D " "                                 | 145 | 222 | 2   | .. | 6  | 6  | 5-33  | 1531-0 | 13-80  | 41-38 | 36-76 | 13-42 | 8-77  | Meen Meer, 10½; on the March, 14.                     |
| E " "                                 | 154 | 227 | 2   | .. | 6  | 6  | 6-92  | 1631-8 | 14-92  | 44-78 | 51-64 | 18-85 | 11-13 | Ferozepore, 12.                                       |
| F " "                                 | 144 | 188 | ..  | .. | 11 | 11 | 7-27  | 1305-6 | ..     | 76-40 | 50-49 | 18-43 | 14-15 | Camp of Exercise, 1; Meerut, 10½; Delhi, 4.           |
| G " "                                 | 146 | 272 | ..  | .. | 5  | 5  | 6-37  | 1863-0 | ..     | 34-25 | 43-63 | 15-92 | 8-55  | Peshawar, 4; Rawal Pindi, 11½.                        |
| H " "                                 | 144 | 301 | 3   | .. | 6  | 6  | 7-67  | 2030-2 | 20-83  | 41-67 | 53-26 | 19-41 | 9-31  | Peshawar, 12.                                         |
| Inf.-Qrs. and A Batt. 11th Brig. R.A. | 3   | 166 | 318 | 3  | .. | 5  | 11-47 | 1915-7 | 18-07  | 30-12 | 69-10 | 25-22 | 13-16 | Barrackpore and Calcutta, 12.                         |
| B Batt. "                             | 3   | 169 | 415 | 6  | .. | 12 | 14-89 | 2455-6 | 35-50  | 71-00 | 88-11 | 32-16 | 13-10 | Ditto ditto                                           |
| C " "                                 | 3   | 167 | 264 | 1  | .. | 10 | 13-10 | 1580-9 | 5-99   | 59-89 | 78-44 | 28-63 | 18-04 | Dinapore, 12.                                         |
| D " "                                 | 3   | 164 | 316 | 1  | .. | .. | 15-32 | 1926-8 | 6-10   | ..    | 93-41 | 34-09 | 17-70 | Benares, 12.                                          |
| E " "                                 | 3   | 162 | 257 | 4  | .. | 2  | 9-32  | 1586-4 | 24-70  | 12-35 | 57-54 | 21-00 | 13-24 | Allahabad, 12.                                        |
| F " "                                 | 3   | 160 | 248 | 3  | .. | 2  | 8-00  | 1555-6 | 18-75  | 12-56 | 50-00 | 18-26 | 11-78 | Saugor, 12.                                           |
| G " "                                 | 3   | 164 | 217 | 1  | .. | 5  | 7-25  | 1323-1 | 6-10   | 30-48 | 44-21 | 16-13 | 12-19 | Nowgong, 11½; on the March.                           |
| Invalid of the Brigade                | ..  | ..  | ..  | 1  | .. | .. | ..    | ..     | ..     | ..    | ..    | ..    | ..    |                                                       |

\* Brigade embarked for England. † Brigade arrived from England in November. ‡ Brigade arrived from England in November.

## ARMY MEDICAL DEPARTMENT

| Regiments, &c.                             | Years of service in the Command. | Average Annual Strength. | Admitted into Hos-<br>pital. | Deaths.   |              | Invalided. | Constantly Sick. | Ratio per 1,000 of Strength. |            |                  |       | Average Sick time to each Soldier. | Average duration of each case of Sick-<br>ness. | Stations during the Year.                                      |
|--------------------------------------------|----------------------------------|--------------------------|------------------------------|-----------|--------------|------------|------------------|------------------------------|------------|------------------|-------|------------------------------------|-------------------------------------------------|----------------------------------------------------------------|
|                                            |                                  |                          |                              | In India. | Of Invalids. |            |                  | Admitted.                    | Invalided. | Constantly Sick. |       |                                    |                                                 |                                                                |
|                                            |                                  |                          |                              |           |              |            |                  |                              |            |                  |       |                                    |                                                 |                                                                |
| Hd.-Qrs. and 2nd Batt.<br>13th Brig. R.A.  | 5                                | 96                       | 159                          | 2         | ..           | 4          | 5.10             | 1056.3                       | 20.83      | 41.07            | 53.13 | Days.<br>19.39                     | Days.<br>11.71                                  | Mean Meer, Fort Lahore, and Fort<br>Govindgarh, 12.            |
| 1st Batt. "                                | 5                                | 90                       | 233                          | 2         | ..           | 3          | 5.62             | 2588.9                       | 22.22      | 33.33            | 62.44 | 22.79                              | 8.80                                            | Fort Govindgarh, 12; dets. at Fort<br>Lahore, &c.              |
| 3rd "                                      | 5                                | 83                       | 163                          | 2         | ..           | 5          | 4.86             | 1964.0                       | 24.10      | 60.24            | 58.55 | 21.37                              | 10.88                                           | Fort Attock.                                                   |
| 4th "                                      | 5                                | 84                       | 146                          | 5         | ..           | 2          | 4.02             | 1738.1                       | 59.52      | 23.81            | 47.86 | 17.42                              | 10.05                                           | Peshawar, 12.                                                  |
| 5th "                                      | 5                                | 87                       | 263                          | 1         | ..           | 9          | 7.88             | 3023.0                       | 11.50      | 103.45           | 90.58 | 32.95                              | 10.94                                           | Ferozepore, 12.                                                |
| 6th "                                      | 5                                | 93                       | 106                          | 2         | ..           | 3          | 4.62             | 1139.8                       | 21.52      | 32.26            | 49.68 | 18.13                              | 15.91                                           | On the March, 31; Kyra Gully, 6½;<br>dets. at Rawal Pindi, &c. |
| 7th "                                      | 5                                | 87                       | 89                           | ..        | ..           | 1          | 3.38             | 1023.0                       | ..         | 11.50            | 38.85 | 14.18                              | 13.86                                           | Calcutta, 12; det. at Darjeeling.                              |
| Hd.-Qrs. and G Batt.<br>19th Brig. R.A.    | Over 10 years.                   | 161                      | 224                          | 4         | ..           | 9          | 7.66             | 1391.3                       | 24.84      | 55.90            | 47.58 | 17.36                              | 12.48                                           | Lucknow, 12.                                                   |
| A Batt. "                                  |                                  | 155                      | 200                          | 1         | ..           | 3          | 8.91             | 1290.3                       | 6.45       | 19.35            | 57.49 | 20.98                              | 16.26                                           | Camp of Exercise, ¾; Agra, 10½;<br>Delhi, ¾.                   |
| B "                                        |                                  | 152                      | 199                          | 2         | ..           | 7          | 6.72             | 1299.2                       | 13.16      | 45.12            | 44.21 | 16.14                              | 12.33                                           | Morar, 12.                                                     |
| C "                                        |                                  | 153                      | 146                          | 1         | ..           | 3          | 7.73             | 954.2                        | 6.54       | 19.61            | 50.52 | 18.44                              | 19.32                                           | Camp of Exercise, ¾; Bareilly, 11.                             |
| D "                                        |                                  | 146                      | 203                          | 3         | ..           | 8          | 7.82             | 1331.8                       | 20.55      | 54.80            | 53.57 | 19.55                              | 14.06                                           | Fyzabad, 12.                                                   |
| E "                                        |                                  | 142                      | 169                          | 3         | ..           | 10         | 9.89             | 1190.0                       | 21.13      | 70.42            | 69.64 | 25.42                              | 21.36                                           | Sitapur, 12.                                                   |
| F "                                        | 160                              | 153                      | 5                            | ..        | 4            | 5.39       | 956.3            | 31.25                        | 25.26      | 33.70            | 12.29 | 12.85                              | Cawnpore, 12.                                   |                                                                |
| *Hd.-Qrs. and 1st Batt.<br>21st Brig. R.A. | ..                               | 94                       | 125                          | 1         | ..           | 3          | 4.21             | 1329.8                       | 10.64      | 31.91            | 44.79 | 16.35                              | 12.30                                           | On the March, and at Morar, 10½.                               |
| *2nd Batt. " "                             | ..                               | 72                       | 102                          | 5         | ..           | 1          | 6.84             | 1416.7                       | 69.44      | 13.89            | 95.00 | 34.68                              | 24.48                                           | On the March, and at Gwalior, 9½.                              |

|                                   |    |       |        |     |    |     |        |        |       |       |        |       |       |                                                                                                                                           |
|-----------------------------------|----|-------|--------|-----|----|-----|--------|--------|-------|-------|--------|-------|-------|-------------------------------------------------------------------------------------------------------------------------------------------|
| *3rd Batt. 21st Brig. R.A.        | .. | 72    | 136    | 3   | .. | 2   | 5 65   | 1888 9 | 41 67 | 27 78 | 78 47  | 28 64 | 15 16 | Allahabad, 10 months.                                                                                                                     |
| *4th "                            | .. | 72    | 182    | 5   | .. | 1   | 7 53   | 2528 0 | 69 44 | 13 89 | 104 58 | 38 17 | 15 10 | Lucknow, 9 $\frac{1}{2}$ .                                                                                                                |
| *5th "                            | .. | 72    | 142    | 3   | .. | 2   | 4 68   | 1972 0 | 41 67 | 27 78 | 65 00  | 23 73 | 12 03 | Agra, 10; on the March, $\frac{1}{2}$ .                                                                                                   |
| *6th "                            | .. | 70    | 231    | 5   | .. | 3   | 6 80   | 3300 0 | 71 43 | 42 86 | 97 14  | 35 46 | 10 70 | Delhi, 9 $\frac{1}{2}$ .                                                                                                                  |
| *7th "                            | .. | 80    | 77     | 1   | .. | 1   | 3 70   | 962 5  | 12 50 | 12 50 | 46 25  | 16 86 | 17 54 | On the March, $\frac{1}{2}$ ; Jutogh, 8; Camp, $\frac{1}{2}$ .                                                                            |
| †1st Batt. 23rd Brig. R.A.        | .. | 10    | 4      | ..  | .. | ..  | 16     | 400 0  | ..    | ..    | 16 00  | 5 84  | 14 60 | Delhi, 14.                                                                                                                                |
| Total Royal Artillery..           | .. | 6,206 | 10,172 | 127 | 1  | 239 | 353 04 | 1639 6 | 20 63 | 38 52 | 56 90  | 20 77 | 12 67 |                                                                                                                                           |
| 41st Company Royal Engineers ..   | .. | 45    | 25     | 2   | .. | 2   | 82     | 555 5  | 44 44 | 44 44 | 18 22  | 6 65  | 11 97 | Roorkee, 12; dets. at Chnekrata, Rawal Pindi, &c.                                                                                         |
| 2nd Batt. 1st Foot                | .. | 837   | 2,417  | 24  | 4  | 69  | 78 85  | 2888 7 | 33 45 | 82 44 | 94 21  | 34 39 | 11 80 | Meen Meer, 12; dets. at Fort Lahore and at Ranikhet.                                                                                      |
| †1st " 3rd "                      | .. | 10    | 680    | 16  | 1  | 33  | 38 30  | 1272 1 | 25 00 | 48 53 | 56 31  | 20 56 | 16 16 | Cawnpore, 9; dets. at Calcutta and at Cawnpore.                                                                                           |
| 1st " 5th "                       | .. | 10    | 858    | 14  | .. | 28  | 41 95  | 1533 8 | 16 31 | 32 63 | 48 89  | 17 85 | 11 64 | Allahabad, 12; det. at Chunar.                                                                                                            |
| 1st " 6th "                       | .. | 8     | 902    | 8   | .. | 36  | 53 03  | 1362 5 | 8 87  | 39 91 | 58 79  | 21 46 | 15 73 | Camp of Exercise, 1; Roorkee, 9 $\frac{1}{2}$ ; Delhi, $\frac{1}{2}$ ; det. at Delhi.                                                     |
| 1st " 8th "                       | .. | 8     | 884    | 31  | 1  | 39  | 45 65  | 1649 3 | 36 20 | 44 12 | 51 64  | 18 85 | 11 43 | Camp of Exercise, $\frac{1}{2}$ ; Peshawar, 9 $\frac{1}{2}$ ; on the March, and in Camp; dets. at Cherat, Nowshera, &c.                   |
| 2nd " 9th "                       | .. | 2     | 900    | 21  | .. | 24  | 35 13  | 1270 0 | 23 33 | 26 67 | 39 03  | 14 25 | 11 22 | Rawal Pindi, 12; dets. at Fort Attock, and at Gharaal Camp.                                                                               |
| 1st Batt. 11th Foot               | .. | 12    | 814    | 5   | 1  | 7   | 33 94  | 1159 7 | 7 37  | 8 60  | 41 70  | 15 22 | 13 12 | Jubbulpore, 12; det. at Saugor.                                                                                                           |
| 81st " 12th "                     | .. | 124   | 214    | ..  | .. | ..  | 5 67   | 1726 0 | ..    | ..    | 45 79  | 16 70 | 9 67  | Umballa, 3.                                                                                                                               |
| 2nd " " "                         | .. | 12    | 887    | 10  | 1  | 27  | 40 36  | 775 6  | 12 40 | 30 44 | 45 40  | 16 61 | 21 41 | Camp of Exercise, $\frac{1}{2}$ ; Calcutta, 11.                                                                                           |
| Hd.-Qrs. and 1st Batt. 14th Foot. | 8  | 505   | 676    | 5   | 3  | 11  | 33 71  | 1338 6 | 15 17 | 21 78 | 66 75  | 24 36 | 18 20 | Sitapur, 12.                                                                                                                              |
| Wing, 1st Batt. 14th Foot.        | 8  | 352   | 415    | 5   | .. | 8   | 27 19  | 1179 0 | ..    | 22 73 | 77 24  | 28 20 | 23 91 | Benares, 12.                                                                                                                              |
| 1st Batt. 17th Foot               | .. | 6     | 899    | 7   | .. | 37  | 43 73  | 1514 0 | 7 78  | 41 16 | 48 69  | 17 75 | 11 72 | Peshawar, 2 $\frac{1}{2}$ ; Kooldunnah, 6 $\frac{1}{2}$ ; Rawal Pindi, 2 $\frac{1}{2}$ ; dets. at Barragully, Kalabagi, Chunglagully, &c. |
| 1st Batt. 18th Foot               | .. | 2     | 920    | 11  | 1  | 31  | 40 08  | 960 9  | 13 04 | 33 70 | 43 57  | 15 90 | 16 55 | Bareilly, 12; dets. at Moradabad and at Ranikhet.                                                                                         |

\* Arrived from England in February. † Embarked for England. ‡ Arrived from Straits Settlements in March. § Arrived from England in October.

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| Regiments, &c.                    | Years of service in the Command. | Average Annual Strength. | Admitted into Hospital. | Deaths.   |              | Invalided. | Constantly Sick. | Ratio per 1,000 of Strength. |       |            |                  | Average Sick time to each Soldier. | Average duration of each case of Sickness. | Stations during the Year.                                                         |
|-----------------------------------|----------------------------------|--------------------------|-------------------------|-----------|--------------|------------|------------------|------------------------------|-------|------------|------------------|------------------------------------|--------------------------------------------|-----------------------------------------------------------------------------------|
|                                   |                                  |                          |                         | In India. | Of Invalids. |            |                  | Admitted.                    | Died. | Invalided. | Constantly Sick. |                                    |                                            |                                                                                   |
|                                   |                                  |                          |                         |           |              |            |                  |                              |       |            |                  |                                    |                                            |                                                                                   |
| *2nd Batt. 19th "                 | ..                               | 786                      | 449                     | 11        | 1            | 8          | 28.34            | 571.2                        | 15.27 | 10.17      | 36.05            | Days. 13.16                        | Days. 23.04                                | Ranikhet, 10½; det. at Bareilly; on the March, 1½.                                |
| Hd.-Qrs. and 2nd Batt. 22nd Foot. | 3                                | 418                      | 151                     | 6         | ..           | 8          | 6.42             | 361.2                        | 14.36 | 19.14      | 15.36            | 5.61                               | 15.52                                      | Ranikhet, 12.                                                                     |
| Wing, 2nd Batt. 22nd Foot.        | 3                                | 433                      | 405                     | 6         | ..           | 12         | 19.96            | 838.5                        | 12.42 | 24.84      | 41.33            | 15.08                              | 17.99                                      | Shahjehanpore, 12.                                                                |
| 1st Batt. 25th Foot               | ..                               | 900                      | 1,454                   | 27        | 1            | 38         | 69.93            | 1616.7                       | 31.11 | 42.22      | 77.78            | 28.36                              | 17.57                                      | Fyzabad, 12.                                                                      |
| 34th Foot                         | ..                               | 929                      | 1,615                   | 16        | ..           | 36         | 67.55            | 1738.4                       | 17.21 | 38.75      | 72.71            | 26.54                              | 15.26                                      | Ferozepore, 12.                                                                   |
| 39th "                            | ..                               | 917                      | 892                     | 7         | 1            | 26         | 37.18            | 972.7                        | 8.72  | 28.35      | 40.55            | 14.80                              | 15.21                                      | Camp of Exercise, 1½; Dagahai, 9; Delhi, ½.                                       |
| 40th "                            | ..                               | 906                      | 1,459                   | 14        | ..           | 28         | 50.20            | 1610.4                       | 15.45 | 30.91      | 55.41            | 20.22                              | 12.56                                      | Calcutta, Dum Dum, Barrackpore, 12.                                               |
| 51st "                            | ..                               | 859                      | 1,249                   | 17        | ..           | 48         | 44.41            | 1454.0                       | 19.79 | 55.88      | 51.23            | 18.81                              | 12.98                                      | Camp of Exercise, ½; Peshawar, 9½; on the March, 2; deta. at Cherat and Nowshera. |
| 54th "                            | ..                               | 851                      | 916                     | 6         | ..           | 15         | 51.23            | 1076.4                       | 7.05  | 17.63      | 60.20            | 21.86                              | 20.41                                      | Moras, 12; deta. at Kasauli, and Fort St. John.                                   |
| 55th "                            | ..                               | 166                      | 46                      | 1         | 1            | ..         | 3.27             | 277.1                        | 12.05 | ..         | 19.70            | 7.20                               | 25.95                                      | Delhi, 1½.                                                                        |
| 59th "                            | ..                               | 877                      | 817                     | 8         | ..           | 20         | 36.70            | 931.6                        | 9.12  | 22.81      | 41.85            | 15.28                              | 16.40                                      | Agra, 11; Delhi, 1.                                                               |
| 2nd Batt. 60th Foot               | ..                               | 868                      | 703                     | 11        | ..           | 35         | 35.69            | 809.9                        | 12.64 | 40.32      | 41.12            | 15.01                              | 18.53                                      | Merutt 12; det. at Fatehgarh.                                                     |
| 14th Batt. 60th Foot              | ..                               | 47                       | 62                      | ..        | ..           | ..         | ..               | 1319.2                       | ..    | ..         | 18.51            | 6.76                               | 5.12                                       | Agra, ½.                                                                          |
| 62nd Foot                         | ..                               | 890                      | 482                     | 9         | 1            | 9          | 25.81            | 544.0                        | 11.23 | 10.10      | 29.00            | 10.57                              | 19.54                                      | Camp of Exercise, 1; Chakrata, 8½; Delhi, ½; on the March.                        |
| 63rd Foot                         | ..                               | 825                      | 1,695                   | 5         | 1            | 21         | 48.56            | 2054.5                       | 7.27  | 25.45      | 58.86            | 21.48                              | 10.46                                      | Jhansi, 10½ months; Delhi, 1½; deta. at Fort St. John.                            |
| 65th "                            | ..                               | 853                      | 1,195                   | 7         | ..           | 39         | 59.47            | 1401.0                       | 8.21  | 45.72      | 69.72            | 25.45                              | 18.17                                      | Fort St. John and at Nowgong.                                                     |

|                       |    |    |    |        |        |     |    |     |         |        |       |       |       |       |       |                                                                                                   |
|-----------------------|----|----|----|--------|--------|-----|----|-----|---------|--------|-------|-------|-------|-------|-------|---------------------------------------------------------------------------------------------------|
| 70th                  | "  | .. | 5  | 878    | 2,093  | 27  | .. | 65  | 63·45   | 2383·9 | 30·76 | 74·08 | 72·27 | 28·38 | 11·06 | Peshawar, Nowshera, and Chert, 12; dets. at Fort Attock, Dera Ismail Khan, and at Hill Depot, &c. |
| 72nd                  | "  | .. | 5  | 877    | 1,535  | 14  | 1  | 53  | 51·10   | 1750·3 | 17·10 | 60·43 | 58·27 | 21·27 | 12·15 | Sialkot, 12; dets. at Amritsar, and at Bankhet.                                                   |
| 73rd                  | "  | .. | 3  | 925    | 828    | 11  | .. | 26  | 52·12   | 895·1  | 11·59 | 28·11 | 56·34 | 20·57 | 23·06 | Camp of Exercise, 2; Subathu, 10½; on the March; det. at Solun.                                   |
| 81st                  | "  | .. | 2  | 905    | 1,774  | 15  | 1  | 25  | 55·51   | 1960·2 | 17·68 | 27·62 | 61·35 | 22·40 | 11·42 | Julundur, 12; dets. at Kangra, Bhagsu, Dalhousie, &c.                                             |
| 85th                  | "  | .. | 9  | 834    | 1,167  | 10  | 3  | 38  | 75·51   | 1399·3 | 15·60 | 45·56 | 90·54 | 33·05 | 23·73 | Camp of Exercise, 1; Lucknow, 11½; det. of Fategarh.                                              |
| 92nd                  | "  | .. | 9  | 855    | 1,540  | 8   | 1  | 13  | 47·11   | 1801·2 | 10·53 | 15·20 | 55·10 | 20·11 | 11·16 | Mooltan, 10½; Camp, 1½; det. at Dera Ismail Khan.                                                 |
| 109th                 | "  | .. | .. | 896    | 1,271  | 17  | .. | 39  | 53·97   | 1418·5 | 18·97 | 43·53 | 60·23 | 21·97 | 15·50 | Dinapore, 12; det. at Hazaribagh.                                                                 |
| 4th Batt. Rifle Brig. | .. | .. | 3  | 905    | 1,070  | 8   | 1  | 22  | 41·70   | 1182·3 | 9·94  | 24·31 | 46·08 | 16·82 | 14·22 | Camp of Exercise, 1; Umballa, 9; on the March; dets. at Solun.                                    |
| Total                 | .. | .. | .. | 28,212 | 38,478 | 418 | 25 | 974 | 1543·65 | 1363·5 | 15·70 | 34·52 | 54·72 | 19·97 | 14·64 | *                                                                                                 |

\* Embarked for England.

† Proceeded to Aden.

‡ Arrived from England in December.

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For the purpose of contrasting the results of sickness in relation to length of residence, the different corps are grouped, in the following Table, according to their periods of service in the Command.

| Corps.                                                       | Completed years of service in the Command. | Average Annual Strength. | Admitted into Hospital. | Died. | Invalided. | Average number of constantly Sick. | Rate per 1,000 of Annual Strength. |       |            |                  | Average Sick time to each Soldier. | Average duration of each case of Sickness. |
|--------------------------------------------------------------|--------------------------------------------|--------------------------|-------------------------|-------|------------|------------------------------------|------------------------------------|-------|------------|------------------|------------------------------------|--------------------------------------------|
|                                                              |                                            |                          |                         |       |            |                                    | Admitted.                          | Died. | Invalided. | Constantly Sick. |                                    |                                            |
| B Brig. Rl. Horse Artillery<br>21st Brig. Royal Artillery... | Under 1 year                               | 755                      | 1,359                   | 24    | 15         | 47.99                              | 1800.0                             | 31.79 | 29.87      | 63.56            | Days.<br>23.20                     | Days.<br>12.89                             |
| 1st Battalion 12th Foot ...                                  |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 4th " 60th " ...                                             |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 9th Lancers ...                                              | 1 year                                     | 2,295                    | 3,868                   | 53    | 100        | 170.89                             | 1685.4                             | 23.09 | 54.86      | 74.46            | 27.18                              | 16.13                                      |
| 1st Battalion 25th Foot ...                                  |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 34th Foot ...                                                |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 2nd Battalion 9th Foot ...                                   | 2 years                                    | 3,602                    | 4,618                   | 57    | 100        | 167.42                             | 1282.1                             | 15.82 | 27.76      | 46.48            | 16.91                              | 13.23                                      |
| 1st " 18th " ...                                             |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 59th Foot ...                                                |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 81st " ...                                                   | 3 years                                    | 4,516                    | 5,167                   | 59    | 127        | 239.47                             | 1197.2                             | 13.67 | 29.41      | 55.48            | 20.25                              | 16.92                                      |
| 13th Hussars...                                              |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 11th Brig. Royal Artillery ...                               |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 2nd Battalion 22nd Foot ...                                  | 4 years                                    | 2,841                    | 4,161                   | 54    | 127        | 155.09                             | 1464.6                             | 19.01 | 44.70      | 54.59            | 19.92                              | 13.60                                      |
| 73rd Foot ...                                                |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 4th Batt. Rifle Brigade ...                                  |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 10th Hussars...                                              | 5 years                                    | 4,079                    | 6,898                   | 69    | 199        | 260.73                             | 1638.7                             | 16.91 | 48.76      | 63.92            | 23.33                              | 18.80                                      |
| 54th Foot ...                                                |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 65th " ...                                                   |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 70th " ...                                                   | 6 years                                    | 1,724                    | 3,056                   | 13    | 58         | 92.26                              | 1772.6                             | 7.54  | 35.64      | 55.42            | 19.11                              | 11.02                                      |
| 72nd " ...                                                   |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 1st Battalion 17th Foot ...                                  |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 63rd Foot ...                                                | 7 years                                    | 917                      | 892                     | 8     | 26         | 37.18                              | 972.7                              | 8.72  | 28.35      | 40.55            | 14.80                              | 15.21                                      |
| 39th Foot ...                                                |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 1st Battalion 6th Foot ...                                   |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 1st " 8th " ...                                              | 8 years                                    | 3,533                    | 4,260                   | 63    | 103        | 185.39                             | 1205.8                             | 17.83 | 29.15      | 52.47            | 19.15                              | 15.83                                      |
| 1st " 14th " ...                                             |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 62nd Foot ...                                                |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 4th Hussars ...                                              | 9 years                                    | 3,006                    | 4,060                   | 38    | 106        | 181.50                             | 1350.6                             | 12.64 | 35.26      | 60.37            | 22.04                              | 16.32                                      |
| 3rd Battery 5th Brig. R.A. ...                               |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 2nd Battalion 60th Foot ...                                  |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 85th Foot ...                                                | 10 years and upwards                       | 10,219                   | 14,118                  | 174   | 363        | 520.00                             | 1381.5                             | 17.03 | 35.52      | 50.96            | 18.59                              | 13.46                                      |
| 92nd " ...                                                   |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 11th Hussars...                                              |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| A Brig. Rl. Horse Artillery                                  | 10 years and upwards                       | 10,219                   | 14,118                  | 174   | 363        | 520.00                             | 1381.5                             | 17.03 | 35.52      | 50.96            | 18.59                              | 13.46                                      |
| F Brig. Rl. Horse Artillery                                  |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 8th Brig. Royal Artillery ...                                |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 19th Brig. Royal Artillery ...                               | 10 years and upwards                       | 10,219                   | 14,118                  | 174   | 363        | 520.00                             | 1381.5                             | 17.03 | 35.52      | 50.96            | 18.59                              | 13.46                                      |
| 23rd Brig. R.A. ...                                          |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 2nd Battalion 1st Foot ...                                   |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 1st " 2nd " ...                                              | 10 years and upwards                       | 10,219                   | 14,118                  | 174   | 363        | 520.00                             | 1381.5                             | 17.03 | 35.52      | 50.96            | 18.59                              | 13.46                                      |
| 1st " 5th " ...                                              |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 1st " 11th " ...                                             |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 2nd " 12th " ...                                             | 10 years and upwards                       | 10,219                   | 14,118                  | 174   | 363        | 520.00                             | 1381.5                             | 17.03 | 35.52      | 50.96            | 18.59                              | 13.46                                      |
| 2nd " 19th " ...                                             |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 53th Foot ...                                                |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 109th " ...                                                  |                                            |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |



## Officers.

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In a mean annual strength of 1,363 commissioned officers, there were 1,098 attacks of illness, and 37 deaths, being in the rates of 805·6 and of 27·15 per 1,000 of the strength respectively. The rate of sickness is 36·9 per 1,000, and that of deaths is 13·81 (or more than double) higher, than the corresponding rate of 1875.

**GENERAL DISEASES.**—The proportion of attacks of diseases in this class is 338·9 per 1,000 of the strength, that of the *febrile group* being 289·8, and that of the *constitutional* 48·4 per 1,000. The death-rate for the class is 8·07 per 1,000 of the strength, of this 7·34 is the proportion for the *febrile*, and ·73 per 1,000, that for the *constitutional group*.

**Eruptive Fevers.**—There were 53 attacks of fevers of this nature, 26 of which were of dengue.

**Continued Fevers.**—Enteric fever, caused 5 attacks, one of them being fatal. Simple continued fever, caused 79, and febricula, 72 attacks.

**Paroxysmal Fevers.**—Ague caused 162, and remittent fever 36 attacks, 4 of the latter were fatal.

**Cholera.**—Five officers were attacked by this disease, in each instance fatally.

The death in the *constitutional group*, was from cancer.

**Diseases of the Nervous System.**—Sunstroke caused 1 death.

**Diseases of the Eye.**—The proportion of attacks is 15·4 per 1,000 of the strength (that of the non-commissioned officers and men being 17·8 per 1,000).

**Diseases of the Circulatory System.**—Of the 7 attacks, 3 were for palpitation. The death was due to fatty degeneration of the heart.

**Diseases of the Respiratory System,** caused 39 attacks; the death in this order was due to pneumonia.

**Diseases of the Digestive System.**—The rate of attacks is 167·3 per 1,000 of the strength (that for the non-commissioned officers and men being 217·2), the rate of deaths is 5·87 per 1,000 (that of the men is 3·26 per 1,000). The fatal illnesses were dysentery (3), diarrhoea (1), intussusception of the bowel (1), hepatitis (3).

**POISON.**—The death returned in this class was due to poisoning by opium.

**CONDITIONS, &c.**—*General Debility.*—17 illnesses were ascribed to this condition; 1 was fatal.

**Injuries.**—*Accidental.*—The accidental deaths were due to drowning (1), injuries by a tiger (1), gunshot wound (1), injury to spine (1), injury from a railway accident (1).

## Women.

The average annual strength of the wives of the non-commissioned officers and men in the Command was 3,552; the admissions into hospital were 3,365, and the deaths (in India) were 74; the rate of admissions is 947·4, and that of deaths is 20·83 per 1,000 of the strength respectively.

Diseases of the *febrile group*, caused 1177 admissions, being in the rate of 331·4 per 1,000 of the strength; the rate of mortality is 5·38 per 1,000. Diseases of the *constitutional group*, caused 163 admissions, being in the rate of 45·9 per 1,000 of the strength; the rate of mortality is 7·09 per 1,000.

**Eruptive Fevers.**—The admissions were 2 for smallpox, 11 for measles, 32 for dengue.

**Continued Fevers.**—Enteric fever, caused 4 admissions, 2 of the attacks were fatal. Simple continued fever, caused 233 admissions, 4 of the attacks being fatal. Febricula, caused 123 admissions. Paroxysmal fevers, caused 753 admissions, being in the rate of 212 per 1,000 of the strength. One death was due to ague, and 4 were due to remittent fever.

**Cholera.**—There were 13 admissions for cholera, 8 of the attacks were fatal.

**Scrophula and Phthisis.**—25 admissions and 9 deaths were due to diseases of this nature.

**Anæmia,** caused 96 admissions, 1 attack was fatal.

**Diseases of the Nervous System.**—There were 6 admissions for sunstroke, all the attacks ended fatally. Epilepsy caused 14 admissions; a death is

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returned under the head of convulsions. Hysteria caused 20 admissions. There were 6 admissions for mental disease, one attack of which was followed by death.

*Diseases of the Eye.*—The rate of prevalence of diseases of this order (conjunctivitis in all except in three instances) is 51·2 per 1,000 of the strength (being about three times greater than that for the non-commissioned officers and men).

*Diseases of the Circulatory System.*—Palpitation caused 11 admissions. The deaths in this order were due to valve disease of the heart (1), syncope (2), embolism (1), rupture of an artery (1).

*Diseases of the Respiratory System.*—Of the 5 deaths 2 were due to bronchitis, and 3 to pneumonia.

*Diseases of the Digestive System.*—The rate of admissions is 162·2 and that of deaths is 4·56 per 1,000 of the strength; as in the preceding year this shows a lower admission-rate associated with a higher death-rate, than in the case of the non-commissioned officers and men.

There were 63 admissions for abortion. Three deaths were consequent on the puerperal state. The admissions into hospital for childbirth were 883 (which are not included amongst those for disease); in 5 instances death ensued.

*General Debility.*—639 admissions are returned as due to this condition, which proved fatal in three instances.

*Children.*

In an annual average strength of 6,870 children of non-commissioned officers and men, there were 5,057 admissions into hospital, and (in India) 358 deaths, being in the proportion of 736·1, and of 52·11 per 1,000 of the strength respectively. The admission-rate is below that of the preceding year, and the death-rate shows a reduction of 20·71 per 1,000 of the strength (the death-rate for persons presumably of similar ages in England, on an average of 10 years, is 27·22 per 1,000 of the living).

*GENERAL DISEASES.*—The admissions for diseases of the *febrile group*, of this class are in the rate of 255·5, and the deaths in that of 7·28 per 1,000 of the strength; compared with 1875, there is a reduction in the death-rate of 11·06 per 1,000. For diseases of the *constitutional group*, the admission-rate is 21·9, and the death-rate is 5·39 per 1,000 of the strength.

*Eruptive Fevers.*—There were 21 admissions for chicken pox, 409 for measles (13 attacks were fatal), 1 for scarlet fever, and 17 for dengue.

*Continued Fevers.*—There were 3 admissions for enteric fever. Simple continued fever, and febricula together, caused 465 admissions; 3 attacks of the first-named disease were fatal.

*Paroxysmal Fevers.*—Ague caused 670 admissions (3 deaths), remittent fever, 92 admissions (13 deaths).

*Cholera*, caused 15 admissions and 12 deaths.

*Other Diseases.*—Diphtheria caused 2 admissions and 1 death, hooping cough 41 admissions and 3 deaths, erysipelas 8 admissions and 1 death.

*Scrofula and Phthisis.*—The admissions for diseases in this group are in the rate of 8·44 per 1,000 of the strength; the admissions for pulmonary consumption were 4, (2 deaths); the admissions for tabes mesenterica were 26, (16 deaths).

*Anæmia*, caused 79 admissions, and 7 deaths.

*Diseases of the Nervous System.*—The deaths in this order were 80 in number, most of them were due to convulsions.

*Diseases of the Eye.*—The admissions for conjunctivitis (904) are in the rate of 131·6 per 1,000 of the strength.

*Diseases of the Respiratory System.*—Croup caused 16 admissions and 1 death; 2 deaths are also returned as due to œdema of the glottis. There were 16 deaths from bronchitis, and 7 from pneumonia.

*Diseases of the Digestive System*, caused 1,125 admissions and 121 deaths, being in the rates of 163·7 and of 17·61 per 1,000 of the strength respectively. Teething, caused 256 admissions and 33 deaths; dysentery 101 admissions and

14 deaths; diarrhoea 602 admissions and 68 deaths; hepatitis 6 admissions *Bengal*. and 1 death; splenitis 11 admissions and 1 death.

*General Debility*.—447 admissions, and 32 deaths, are returned under this condition (14 deaths of children prematurely born are not included).

*Poisons*.—In this class there was 1 admission for poisoning by arsenic, 3 for poisoning by alcohol, and one for the poison of a snake (fatal).

#### SANITARY REPORT.\*

The sanitary history of the Bengal Command for 1875 has been to some extent anticipated by the remarks embodied in the Report for 1874, and which were not written till late in the following year.

During the period under review in the present report, the medical administration of the Command was a divided one; Surgeon-General Currie, C.B., having been invalided home in June, the charge of the department in Bengal devolved on Deputy Surgeon-General T. Crawford, the then senior officer of the British medical service in the Command.

This will account in some measure for the absence of full details of sanitary inspections which this report would doubtless have contained had Surgeon-General Currie been able to return to India in time to make his annual inspections during the winter of 1875-76.

In his absence, and to enable the officiating Surgeon-General to report upon questions of general importance, the latter officer visited several of the more important military stations in the Command, and the results of his observation, as well as the points of sanitary importance discussed in the reports from administrative officers of Circles, are given below:—

*Presidency Circle*.—The medical history of the Circle is described as uneventful, and therefore satisfactory. There were no deaths from cholera among the troops, and the death-rate from all causes was only 13·45 per 1,000, hepatitis being the most fatal form of the diseases met with.

The sanitary defects pointed out can hardly be said to have contributed materially to this mortality. Considerable improvements have been made, and are still in progress, in the barracks at Darjeeling, where two of the old barracks have been demolished to be replaced by new buildings, one of which has been, completed and the other is in course of construction. The married quarters for the Royal Artillery have also been finished, and further improvements in barrack accommodation are in contemplation.

At Hagarebagh, improvements have also been made by throwing down two barracks, and thus lessening surface crowding, and providing for free atmospheric movement.

As might be expected from its situation and climate, malarious fevers were the prevalent diseases at Barrackpore. These are correctly attributed to the low marshy character of the surrounding country. The sickness from this and other causes was, however, less than usual, and this is attributed to improved water supply. Further advances in this direction are in contemplation, and will here, as elsewhere in this Circle, yield still greater benefits.

During his inspection of this station in December, Dr. Crawford noticed that the fever then prevalent was, as stated above on the authority of Surgeon-Major Stewart's report, a purely malarious one, attributable to local malarious influences. The station is surrounded by jungle, and the trees and hedges are unpruned, so that the free circulation of air is impeded. The surface and sub-soil drainage is also less free and open than it should be. Seasonable influences have no doubt much effect upon this fever, but improved drainage and judicious pruning of trees, and clearing of neighbouring jungle where too close and thick, would mitigate the type of the disease. Night urinals in barracks should also be provided, so that the men might be spared, as much as possible, exposure to the chilling influences of the night air. It is worthy of notice that the residents along the high river bank do not suffer from malarious fever

\* The above Report was received too late for publication in the Volume for 1875.

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nearly to the same extent as those occupying bungalows in low sites further into the lines.

*Allahabad Circle.*—The health of the troops in this Circle during the year has been good, the mortality being only 15·67 per 1,000, notwithstanding the appearance of cholera in an epidemic form at Allahabad and Cawnpore. Venereal diseases are also very prevalent in this Circle, the 73rd Regiment again showing the highest number of admissions under this head. The Deputy Surgeon-General ascribes the prevalence of venereal in a good many cases to defective regimental supervision.

Chunar is not in a very satisfactory state. Deputy Surgeon-General Kendall reports:—

"The hospital is situated quite adjacent to a portion of the town of Chunar, called Mohanna; this, before the inundation of the town in August last, according to reports on the subject, was covered with hovels huddled together in every conceivable manner, without the smallest attempt at arrangement as far as escape of water, &c. It is less than a quarter of a mile long and about one-sixth of the length in breadth, with a population in 1872 of 10,346 persons. The inhabitants of this densely populated place are of the poorest class, utterly destitute of any sense of, or desire for, cleanliness. Heaps of animal and vegetable matter, and even human excrement in various stages of decomposition, are only too frequently met with, and render the atmosphere of the place faecal and sickening. In fact there exists here every essential and accessory, if not for the generation at least to the propagation of every disease; cases of most infectious disease are always to be found. A large proportion of the houses of this spot were destroyed by the flood of August last, and representations detailing the deplorable sanitary condition of the place were then made to the Quartermaster-General, with a view to the purchase and clearing of the town, by Government but without success. In the event of an outbreak of cholera in a quarter so circumstanced, and in such proximity to the hospital, what is to be done with patients? Hospital tents erected at the fort, or any other place, will not be suitable at all seasons. I think, then, the establishment of an hospital ward in the fort to be desirable, and deserving of timely consideration."

Cawnpore is greatly and urgently in need of a new hospital for the sick of the European corps stationed there. This necessity has been represented, and will no doubt receive every consideration.

Jubbulpore is highly favoured in some respects, but the troops are exposed to malarious influences during the last three months of the year, which increase materially the admissions into hospital. The officer in medical charge thinks the drainage of the low marshy ground in the vicinity of the station desirable, and suggests that its injurious influences might be lessened if it were planted with *Eucalyptus globulus*, or other suitable trees or shrubs. This suggestion need not involve Government in heavy outlay, and if acted upon there is little doubt that the result would be beneficial.

Pachmarhi is still without a suitable hospital, the sick being accommodated in a wing of one of the barracks. As everything connected with this station is at present of general interest, it may be well to quote here the general conclusions arrived at by Surgeon-Major J. J. Thompson, at present in medical charge. They are to the following effect:—

"A careful perusal of the sanitary and other reports of my predecessors, and a close scrutiny of the medical returns of the station since its occupation by European troops, combined with the medical facts and figures of the past year, place me in a position, notwithstanding my short local experience (having only assumed medical charge on the 8th November, 1875) to express a very favourable opinion on the capabilities and advantage of this beautiful mountain plateau as a temporary residence for either invalid or healthy soldier.

"There can be no doubt that the prevalence of ague, and the general unhealthiness of the station during the earlier years of its occupation, which drew forth such unfavourable reports from the medical officers of the time, arose from local causes which were remediable, and which have since been removed.

"Last year Surgeon-Major N. H. Stewart, in his report for 1874, pointed out how very much more satisfactory the sanitary condition of the station had

become when compared with the records of 1873. This improvement has not ceased to continue, as may be seen by a reference to a preceding section of this report, where the admissions for ague in 1875 were shown to be even less than half the number accorded for 1874.

"For men whose constitutions have become enervated by service in the plains, or who have suffered from frequent attacks of malarious fever, the climate of Pachmarhi appears to offer many advantages."

**Lucknow Circle.**—The only points of any sanitary importance mentioned in the report of the Deputy Surgeon-General of this Circle are, that when cholera appears at Lucknow it always breaks out first in the European Infantry Lines, occupied by the 65th Regiment, the causes of which are not explained, and that Naini Tal is particularly exempt from hill diarrhoea. This latter fact is all the more remarkable when coupled with the less creditable one that the lake from which water for all purposes is drawn receives the "washings from the sides of the hills, including the sweepings from private houses, servants' houses, stables, &c., as well as the whole of the dirt from both native bazaars."

The excessive prevalence of venereal diseases among the men of the 85th Regiment is also commented on, but this subject will be noticed towards the end of this report.

**Gwalior Circle.**—There is nothing of pressing sanitary importance in regard to this Circle which will not be found in the reports of last year. The Superintendent Surgeon-Major's special report has not been received, and as Surgeon-Major Irvine has left for England, his experience regarding the requirements of the Circle cannot now be made available in the compilation of this report.

**Meerut Circle.**—The health of the troops in this Circle has been remarkably good, the mortality having only reached 10·17 per 1,000. There is still, however, room for improvements, as may be inferred from the number of deaths ascribed to enteric fever, malarious fever, dysentery, and liver diseases.

At Meerut many of the barracks in the Cavalry Lines are old, with narrow verandahs and floors, but little raised above the surface of the ground.

The Hospital of the Royal Artillery is old and of inferior construction and arrangement, but kept in excellent order. The European Infantry Hospital is open to similar criticism. Both require additional fireplaces and fires in winter. There is some surface-crowding in the Artillery Lines, and the station generally is insufficiently drained. Works are now in progress to remedy this serious defect.

At Agra, additional hospital accommodation is required. The women's hospital here, as at many other stations, is peculiarly unsuitable for the requirements of that class of patients. A new women's hospital, on the standard plan, should be provided.

The sanitary condition of Delhi is now so satisfactory that little need be said about it. Some slight alteration in the ventilation of the cells, improvement in the gradient of the surface drains, and further improvement in the water supply are said to be desiderata. The beneficial results of the sanitary improvements which have made Delhi what it now is, as contrasted with what it was ten or fifteen years ago, ought to encourage the governments of other provinces to go and do likewise at other stations still in need of such works.

The fine double-storeyed hospital in the fort at this station is a model, well worthy of imitation elsewhere, but the cost will probably preclude its general adoption.

**Sirhind Circle.**—Here, as elsewhere in the Command, the health of the troops has been good, although the death-rate has been high—18·34 per 1,000. This is attributable to an outbreak of cholera at Umballa and Kasauli, resulting in considerable mortality among the men of the Rifle Brigade at the former and convalescents at the latter station.

There is still a deficiency of barrack accommodation for the infantry regiment at Umballa, but many sanitary improvements have been made during the year, among which may be mentioned new schoolhouses for the Artillery and Rifle Brigade, the provision of fireplaces and ceilings in hospitals, the erection of improved urinals, the better protection of water tanks, and the roofing and flooring of Right Wing Infantry Hospital now completed.

At Kasauli, the wooden floors in the hospital and in the married men's quarters have been taken up and relaid over a thick layer of concrete, the

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interspace being in every instance well ventilated. This is a very great improvement. It was also a work of pressing sanitary necessity, as the floors were rotten and the soil beneath was not only porous but damp and offensive, and highly charged with decaying organic matter.

Other desiderata pointed out in last year's report are still under consideration or in course of adoption.

At Dagshai the re-roofing of the old barracks has been completed, new cook-houses have been built, and the Fitzwygram married barracks are in progress. The re-flooring of the old barracks much needed, and the construction of new latrines are also sanctioned, and will shortly be carried out.

Increased hospital accommodation, new guard-room and cells are still desiderata, which will doubtless be provided for as funds can be made available.

At Subathu, the old barracks are slowly disappearing to make room for new buildings on a better plan. But the new hospital recently built on the top of an isolated hill is showing indications of the rottenness of the rock on which it stands, and there is reason to fear that much, if not the whole of the building, will have to be shored up, if not to a great extent reconstructed.

The works in progress last year at Jutogh have been completed, and the sick and married families are now satisfactorily provided for.

Extensive improvements have also been carried out in the old barracks at Jullundur, and also in the hospitals at that station, and although there is still much to be done there before the cantonment arrangements can be pronounced in every way satisfactory, the troops are on the whole well-housed and cared for.

*Lahore Circle.*—The health of the troops at Meean Meer during the autumn month of the year caused some anxiety, and in consequence the Officiating Surgeon-General visited this station in February of the present year. The results of his visit were fully stated in a letter addressed to the Quartermaster-General at the time, portions of which are here reproduced. The sickly men of the Royals, selected for transfer to the hills, were sent to Rani-Khet.

Extract from a letter, dated Meean Meer, 19th February, 1876, from the Officiating Surgeon-General, British Forces, to the Quartermaster-General, Army Head Quarters, Calcutta :—

"I have the honour to report, for the consideration of the Right Honourable the Commander-in-Chief, that I inspected the whole of the 2nd Battalion 1st Royals yesterday, and the remainder of the European troops in cantonment this morning.

"The chief sickness among the men and families of the Royals has been caused by malarious fevers. Out of the whole regiment 178 men only have escaped the fever altogether. Of the remainder, about 120 are still suffering from its effects to such an extent as to preclude the hope of early recovery without change, and some 30 more, including 14 boys, are, from various causes, equally in need of transfer to the hills. All the others who have had fever have either shaken it off or are doing so rapidly, and will, I have no doubt, regain their health where they are. I would, therefore, recommend for the favourable consideration of his Excellency that, as I have already telegraphed, accommodation at Hill Sanitaria for 150 men, including eight families, the members of which are suffering from malarious fever, be, if possible, allotted to the Royals, and that the men be moved up as early as is consistent with the general arrangements for the transfer of convalescents to the hill depôts. These men should, if practicable, be sent to stations having good hospital accommodation, as many of them are still in need of careful dieting and medical treatment. They are not, however, suffering to any appreciable extent from organic disease, so that there is good reason for believing that a few months change will restore the greater number, if not the whole of them, to the ranks as effectives.

"Of the other troops at Meean Meer, the Royal Horse Artillery have suffered but little from the fever, and are now in good health. The battery of Field Artillery has suffered somewhat more severely, but they too are rapidly shaking off the effects of the fever. There were but few of the Garrison Battery present, the greater number being absent on detachment duty. But those paraded for inspection seemed to be in very good health.

"I have no suggestions to offer relative to the sanitary surroundings of the troops at Meean Meer. Careful and judicious cultivation of waste grounds, effective surface and subsoil drainage, and the filling up of hollow places, and levelling of all dikes and embankments which interfere with the free escape of stagnant surface water, seem to me the most likely measures to effect a radical improvement in the sanitary condition of the station. Works of this description are now in progress.

"The cultivation of crops and trees within cantonment limits can only be carried out by the aid of irrigation, to which I believe some are disposed to attribute the prevalence of malarious fevers at Meean Meer. This opinion does not appear to me to be well founded; on the contrary, provided the irrigation is moderate—that is to say, to the extent only required for the healthy growth of the crops—and so regulated as not to obstruct the free circulation of the air through the soil and subsoil, it can do no appreciable injury to the public health, while the presence of healthy vegetation, within moderate limits as to height and luxuriance of growth, will be beneficial.

"I have no reason to question the judiciousness of the drills, exercises, and duty arrangements of the Royals. I allude to the subject here merely to show that it has not escaped my notice, and to add that, in my opinion, a superabundance of unoccupied time is a great misfortune to a corps so circumstanced.

"Frequent short drills and exercises in the open air at seasonable hours, and in suitable clothing, are not only admissible, but desirable, and the more fully the soldier's spare time is occupied in industrial pursuits, and rational amusements and recreations within doors when he cannot be out with safety, the better for his health.

"It is desirable to limit as far as practicable the night duties of the troops during the prevalence of malarious fevers, but the Lieutenant-General Commanding assured me that this point had not escaped his attention."

*Peshawar Circle.*—Owing probably to the recent arrival of the Deputy Surgeon-General of this Circle, the report for the year 1875 does not discuss fully many points of great sanitary importance, especially in regard to Peshawar, and as this subject was referred for the second time to Deputy Surgeon-General Crawford, when officiating as Surgeon-General, it may not be out of place here to give *in extenso* the letter written by him to the Quarter-master-General on the sanitary aspect of the occupation of Peshawar. This letter should be viewed in continuation of the Report of the Special Committee assembled at Peshawar in the beginning of the year under review.

Copy of Letter, dated Umballa, 11th February, 1876:—

"I have the honour to acknowledge the receipt of your letter No. 1925, dated Camp Delhi, 2nd instant, with its enclosures, herewith returned, and conveying the desire of the Right Honourable the Commander-in-Chief for my opinion on the several points reported upon, as well as on the entire question of the occupation of Peshawar and Cherat.

"2. As the occupation of Cherat is designed by those who advocate that measure to provide a remedy for the unfavourable health conditions of the garrison of Peshawar, it will be more convenient to review the question as it affects the latter station first, and then to see how far the occupation of Cherat meets the requirements of the forces at Peshawar.

"3. I have already had the honour of submitting a report of a special committee, of which I was president, upon the causes of sickness among British troops stationed at Peshawar, for his Excellency's consideration, and as the conclusions of that committee will not, I believe, be questioned by any competent sanitary authority to whom the Peshawar Valley is as well known as it is to the members of the committee, it may suffice for present purposes to recapitulate very briefly those which have reference to the causes of the chief diseases prevalent.

"4. The committee reports at page 8 of the proceedings that—

"The chief causes of the sickness existing among the British troops at Peshawar are climatic—(a) continuous high temperature in summer causing continued fevers; (b) malaria in the autumn months giving rise to intermittent fevers."

"5. These causes may be mitigated, and the severity of the fevers prevalent

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during the summer months, as well as in the autumn, may be naturally lessened by measures of the description indicated in the report above quoted, but so long as Peshawar continues to be occupied as a military station, so long will the troops, both European and Native, continue to suffer from malarious fever during the autumn months, until, through the lapse of time, the wheels in this valley silt up, and waste plains and marshes are drained, and the whole valley cultivated with due regard to the requirements of public health.

"6. Such being, in my opinion, the true state of the case in regard to Peshawar, it is obvious the troops must continue to suffer from sickness so long as they are required to serve there, and that any remedial measures to be effective must have for their object the removal of the troops, or as many of them as can be spared, beyond these unfavourable influences.

"7. The occupation of Cherat is held by some to be the most effectual, and at the same time the most economical way of meeting this requirement, and I may, I presume, class the writers of the annexed reports among this number, provided the troops at Cherat are comfortably housed in furnished huts of suitable construction.

"8. To cover a spot so limited in extent with huts for so large a force, and houses for the followers, as suggested by Colonel Beresford, and to leave the whole untenanted for six months of the year, would unquestionably lower materially the health conditions of the locality, not only, as the Commander-in-Chief remarks, by protecting the site from the purifying influences of the winter's rains and frost, but also by affording cover for wild animals and vermin, and numberless corners for the lodgment of decaying organic matter, the annual augmentations of which would eventually destroy the reputation of the locality as a sanitarium.

"9. Moreover, the climate of Cherat is very variable, and the elevation is hardly sufficient for a sanitarium to which it is proposed to transfer men suffering from diseases of malarious origin. Changes of temperature are rapid and considerable in degree, reaching in June to 107° in tents, 100° in a permanent building used as the hospital, and 95° in a well-built private hut. The water supply is hard, very limited, and procurable only from a considerable distance.

"10. Brigadier General Wilson, who is a warm advocate for the establishment of a permanent sanitarium at this place, is apparently doubtful as to the benefits to be derived from its occupation in May and June. He writes:—"Four years experience enables me to say that usually it is not until the month of July, after the monsoon has well set in below, that the full advantages of the climate are experienced."

"11. Surgeon Major Meane, the officer in medical charge, appears to be much of the same opinion. When urging the necessity of providing hut accommodation for the troops, he says:—"The exposure to heat in the first two months of the season being so great, the advantage over the plains is but very little marked."

"12. Unfortunately the excepted months are those in which the lives of the soldiers are in most danger at Peshawar. Malarious fevers produce present inefficiency and eventual loss from invaliding, but heat-apoplexy kills with distressing celerity and certainty. If Cherat be not suitable as a sanitarium during these months without large outlays in erecting permanent barracks, half its alleged value to the Peshawar garrison is at once discounted.

"13. These and other reasons, both sanitary and general, such as the impossibility of removing during the summer, without great risk to life, the sick in hospital and the women and children back to Peshawar, and the equally perplexing alternative of protecting them at Cherat in the midst of hostile tribes, should any serious *émeute* occur in the valley—lead me to the conviction that Cherat is only suitable as a temporary and occasional retreat for the fever-stricken members of the Peshawar garrison, and that for this purpose no sort of shelter is more appropriate or more economical than tents well choppered in, as is customary under similar circumstances in other parts of India, so as to protect the inmates from extreme noon-day heat, as well as from sudden alternations of temperature at other times.

"14. But were Cherat all that could be desired as to climate, local surroundings, space, water supply, &c., and were buildings erected of the best



possible description, and ample as to extent of accommodation for all the men that can be spared from Peshawar after the most necessary duties have been provided for, it would still fail to meet the real requirements of that garrison so long as the interchange of men on the principle now adopted is followed. *Bengale.*

"15. In the spring, and while the troops in the valley are still healthy, as many as can be spared are sent away to Cherat, not, as I understand, to regain their health (for that is still good, invalids and sickly men having been previously sent home or transferred to Murree), but to retain it, in order that, later on, when those left behind sicken and are no longer able to perform their duties, they may take their place; and having contracted the fever, which spares few, if any, who are exposed to its causes, become fit subjects for change, or possibly for invaliding.

"16. It is this unvarying routine, and the inevitable exposure of all in turn to malarious influences in the valley, for which a remedy is needed, and, unless the Commander-in-Chief can spare half the garrison of Peshawar for permanent localization at Cherat, and the Government of India will erect there a suitable cantonment for their accommodation, and treat them as a reserve, to be called to the valley only in case of military or political necessity, the station should be, in my humble opinion, looked upon only as a favourite camp ground to which a portion of the forces in the valley can at any time move in case of unusual sickness or other need.

"17. In writing this, I have no desire to question the greatness of the boon conferred on the troops by the temporary occupation of Cherat as a sanatorium, or to throw any doubt upon the fact that men suffering from the debilitating fevers of the valley recover more quickly and more perfectly at Cherat than they would do if left at Peshawar or Nowshera; on the contrary, I agree with the Sanitary Commissioner with the Government of India, that the good effect of the change on sickly men from Peshawar and Nowshera 'is very decided, and there can be no question that this hill has proved of great benefit to the health of the troops in the valley.'

"18. It must not be forgotten, however, in estimating the value of the figures given in paragraph 20 of Sanitary Report for 1874, from which the above quotation is copied, that Peshawar suffered severely from cholera during 1872, which accounts for its high death-rate for that year, while Nowshera and Cherat escaped, and also that the troops were withdrawn from Cherat in 1874 before the sickly season at Peshawar had passed over. These conditions have been to some extent reversed in 1875, and although the returns for that year are not yet complete, I am inclined to think the result, as regards Cherat, will be less satisfactory than the experience of 1874 seems to foreshow.

"19. Political and military considerations are points upon which I do not feel competent to enter, although they must mainly determine the sanitary policy to be pursued in regard to the military occupation of the Peshawar valley. But assuming for the moment the best policy is in this instance in harmony with the highest sanitary interests of the troops, the latter will in my opinion be best provided for by reducing the troops at Peshawar to the smallest possible number consistent with safety, and by placing all reserves at some convenient point on the other side of the Indus.

"I have already written so fully on the barrack accommodation at, and sanitary requirements of, Peshawar, that I do not think it necessary to add any further remarks on those points here."

Madras.

## II.—MADRAS.

## STATISTICAL REPORT.

The average annual strength of the non-commissioned officers and men in the Command was 11,132, the admissions into hospital were 12,224, the deaths including those of invalids on the voyage, or after arrival in England, were 185, the average number of constantly sick was 561. The rates given by these numbers are, for admissions 1098·1, for deaths 16·62, and for constantly sick 50·40 per 1,000 of the strength respectively. The admission-rate is 23·9, and the death-rate is 79 per 1,000 of the strength higher than in 1875; the rate of constantly sick is 5·13 per 1,000 men lower.

The admissions and deaths in the different classes and orders of diseases, are shown in the following Table:—

| Orders.                 | Diseases.                         | Strength, 11,132. |                 |              | Ratio per 1,000 of Mean Strength. |       |           |       |
|-------------------------|-----------------------------------|-------------------|-----------------|--------------|-----------------------------------|-------|-----------|-------|
|                         |                                   |                   |                 |              | 1876.                             |       | 1869-75.  |       |
|                         |                                   | Admitted.         | Deaths.         |              | Admitted.                         | Died. | Admitted. | Died. |
|                         |                                   |                   | In the Command. | Of Invalids. |                                   |       |           |       |
| I. General Diseases.    |                                   |                   |                 |              |                                   |       |           |       |
| 1                       | Febrile Group ..                  | 2,254             | 46              | ..           | 202·5                             | 4·13  | 235·8     | 3·64  |
| 2                       | Constitutional „ ..               | 1,507             | 12              | 4            | 135·4                             | 1·44  | 159·2     | 2·07  |
| II. Local Diseases.     |                                   |                   |                 |              |                                   |       |           |       |
| Diseases of the—        |                                   |                   |                 |              |                                   |       |           |       |
| 1                       | Nervous System ..                 | 238               | 24              | ..           | 21·4                              | 2·15  | 19·7      | 1·94  |
| 2                       | Eye .. ..                         | 171               | ..              | ..           | 15·4                              | ..    | 19·8      | ..    |
| 3                       | Ear .. ..                         | 104               | ..              | ..           | 9·8                               | ..    | 9·4       | ..    |
| 4                       | Nose .. ..                        | 6                 | ..              | ..           | ·5                                | ..    | ·4        | ..    |
| 5                       | Circulatory System ..             | 189               | 14              | 1            | 17·0                              | 1·35  | 18·9      | 2·00  |
| 6                       | Absorbent „ ..                    | 235               | ..              | ..           | 21·1                              | ..    | 25·3      | ..    |
| 8                       | Respiratory „ ..                  | 454               | 3               | ..           | 40·8                              | ·27   | 43·5      | ·56   |
| 9                       | Digestive „ ..                    | 3,537             | 50              | 5            | 317·7                             | 4·94  | 340·4     | 7·16  |
| 10                      | Urinary „ ..                      | 985               | 1               | 1            | 88·5                              | ·18   | 80·5      | ·17   |
| 11                      | Generative „ ..                   | 155               | ..              | ..           | 13·9                              | ..    | 15·3      | ..    |
| 12                      | Organs of Locomotion..            | 16                | ..              | ..           | 1·4                               | ..    | 5·2       | ·04   |
| 13                      | Cellular Tissue ..                | 189               | 1               | ..           | 17·0                              | ·09   | 17·1      | ·01   |
| 14                      | Cutaneous System ..               | 729               | ..              | ..           | 65·5                              | ..    | 83·8      | ..    |
| III. Conditions, &c.    |                                   |                   |                 |              |                                   |       |           |       |
|                         | Debility.. ..                     | 356               | ..              | ..           | 32·0                              | ..    | 36·7      | ·06   |
| IV. Poisons             |                                   |                   |                 |              |                                   |       |           |       |
|                         | .. ..                             | 67                | 4               | ..           | 6·0                               | ·36   | 8·9       | ·50   |
| V. Injuries.            |                                   |                   |                 |              |                                   |       |           |       |
| 2                       | Accidental .. ..                  | 1,007             | 14              | ..           | 90·5                              | 1·26  | 103·5     | 1·17  |
| 3                       | Homicidal .. ..                   | 1                 | ..              | ..           | ·1                                | ..    | ·3        | ·05   |
| 4                       | Self-inflicted .. ..              | 5                 | 5               | ..           | ·4                                | ·45   | ..        | ·51   |
| 6                       | Judicial.. ..                     | ..                | ..              | ..           | ..                                | ..    | ..        | ·04   |
| VI. Surgical Operations |                                   |                   |                 |              |                                   |       |           |       |
|                         | .. ..                             | 8                 | ..              | ..           | ·8                                | ..    | ·5        | ..    |
|                         | Cause unknown ..                  | ..                | ..              | ..           | ..                                | ..    | ..        | ·01   |
|                         | No appreciable disease..          | 16                | ..              | ..           | 1·4                               | ..    | 1·2       | ..    |
|                         | Total .. ..                       | 12,224            | 174             | 11           | 1098·1                            | 16·62 | 1225·4    | 19·93 |
|                         | Average of 10 years, }<br>1866-75 | ..                | ..              | ..           | 1284·3                            | 20·86 | ..        | ..    |

**GENERAL DISEASES.**—The rate of prevalence of diseases in this class is *Madras*. 138 per 1,000 men lower than in the preceding year; the whole of the reduction is in the *constitutional group* of the class, in the *febrile group* there is a small increase. The rate of mortality for the whole class is 1·75 per 1,000 men in excess of the rate for 1875, but whilst the increase for the febrile group amounts to 2·71 per 1,000, there is a reduction of ·96 per 1,000 in that of the *constitutional group* of diseases.

The admissions and deaths from the principal diseases in this class, are shown in the following Table:—

| General Diseases.             | Admitted. | Died. | Ratio per 1,000 of Mean Strength. |       |           |       |
|-------------------------------|-----------|-------|-----------------------------------|-------|-----------|-------|
|                               |           |       | 1876.                             |       | 1869-75.  |       |
|                               |           |       | Admitted.                         | Died. | Admitted. | Died. |
| <i>Febrile—</i>               |           |       |                                   |       |           |       |
| Eruptive Fevers .. ..         | 13        | 1     | 1·2                               | ·10   | 1·3       | ·09   |
| Continued „ .. ..             | 1,557     | 25    | 139·9                             | 2·24  | 118·2     | 1·43  |
| Paroxysmal „ .. ..            | 619       | 1     | 55·6                              | ·09   | 139·6     | ·43   |
| Cholera .. ..                 | 34        | 17    | 3·1                               | 1·52  | 2·9       | 1·57  |
| Influenza .. ..               | 18        | ..    | 1·6                               | ..    | 1·4       | ..    |
| Erysipelas .. ..              | 6         | ..    | ·5                                | ..    | 1·9       | ·07   |
| Other diseases of this Group. | 7         | 2     | ·6                                | ·18   | ·5        | ·05   |
| Total .. ..                   | 2,254     | 46    | 202·5                             | 4·13  | 235·8     | 3·64  |
| <i>Constitutional—</i>        |           |       |                                   |       |           |       |
| Rheumatism .. ..              | 357       | ..    | 32·1                              | ..    | 40·4      | ·01   |
| Syphilis .. ..                | 993       | 1     | 89·2                              | ·09   | 100·1     | ·22   |
| Scrofula, Phthisis, &c. ..    | 111       | 14    | 9·9                               | 1·26  | 12·6      | 1·63  |
| Scurvy and Purpura .. ..      | 1         | ..    | ·1                                | ..    | ·5        | ·01   |
| Anæmia .. ..                  | 32        | ..    | 2·9                               | ..    | 4·7       | ..    |
| Other diseases of this Group. | 13        | 1     | 1·2                               | ·00   | ·9        | ·20   |
| Total .. ..                   | 1,507     | 16    | 135·4                             | 1·44  | 159·2     | 2·07  |

*Eruptive Fevers*, are in a fractionally lower rate of prevalence than in the preceding year; 6 of the admissions were for dengue.

*Continued Fevers*.—The rate of admissions exceeds that of the preceding year by 20·8 per 1,000 men, and the death-rate is 1·44 per 1,000 higher.

*Paroxysmal Fevers*.—The rate of admissions is 19·1 per 1,000 men lower; the death-rate is lower than in 1875.

*Cholera*.—Compared with the preceding year there is an increase of 2·5 per 1,000 men in the admissions for this disease, which was epidemic in the civil population.

*Rheumatism*.—There is a small increase in the rate of prevalence on that of 1875.

*Syphilis*.—The rate of prevalence is lower than that of the preceding year by 19 per 1,000 men.

*Scrofula, Phthisis, &c.*—Diseases in this group are in a slightly lower rate of prevalence than in the preceding year.

*Anæmia*.—The rate of prevalence is fractionally higher than in 1875.

**LOCAL DISEASES.**—*Diseases of the Nervous System*.—The rate of admissions is 8·1 per 1,000 men, or more than a third higher than that of 1875, and the rate of deaths is 1·08 per 1,000, or one-half higher; the last result is mainly due to the greater fatality of sunstroke in the present year.

*Diseases of the Eye*.—The rate of admissions is 1·4 per 1,000 men higher than that of 1875.

*Diseases of the Circulatory System*.—The rate of admissions is 3·9 per 1,000 men, and that of deaths is ·70 per 1,000 lower than in 1875.

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*Diseases of the Respiratory System.*—The rate of admissions is 4·1 per 1,000 men higher, whilst that of deaths from diseases in this order is '26 per 1,000 lower, than in the preceding year.

*Diseases of the Digestive System.*—The rate of prevalence is 22·9 per 1,000 men higher than in the preceding year, whilst the rate of mortality is '40 per 1,000 lower; tonsillitis, and dyspepsia were the diseases of a non-fatal character which were of greater comparative frequency in the present year; dysentery and hepatitis, caused fewer admissions than in 1875.

*Diseases of the Urinary System.*—Compared with 1875, this order shows a trifling reduction in the rate of admissions.

CONDITIONS, &c.—*Debility.*—The rate of admissions exceeds that of 1875 by 5·9 per 1,000 men.

POISONS.—The rate of admissions differs only fractionally from that of 1875.

INJURIES.—*Accidental.*—The rate of admissions is fractionally higher than that of the preceding year. The causes of death were drowning in 5 instances, fracture in 7, dislocation in 1, and injury of the brain in 1.

*Self-inflicted Injuries.*—The mode of death was by gunshot in 4 instances, and by cut throat in 1.

The admissions and deaths at each of the principal stations in the Command are shown in the following Table, which is taken from the report of the Principal Medical Officer:—

| Stations.    |                  | Average Annual Strength. | Average Daily Sick. | Admitted. | Died. | Invalided | Ratio per 1,000 of Strength. |           |       |            | Average of 9 years. |       |
|--------------|------------------|--------------------------|---------------------|-----------|-------|-----------|------------------------------|-----------|-------|------------|---------------------|-------|
|              |                  |                          |                     |           |       |           | Daily Sick.                  | Admitted. | Died. | Invalided. | Admitted.           | Died. |
| PRESIDENCY.  | Fort St. George  | 636                      | 31                  | 718       | 9     | 27        | 48·74                        | 1128·9    | 14·15 | 42·45      | 1407·2              | 20·88 |
|              | Palaveram ...    | 21                       | ...                 | 5         | ...   | ...       | 238·1                        | ...       | ...   | 505·1      | 13·18               |       |
|              | St. Thomas's Mt. | 341                      | 20                  | 468       | 7     | 30        | 58·65                        | 1372·4    | 20·53 | 87·98      | 1281·9              | 22·58 |
|              | Trichinopoly ... | 267                      | 20                  | 284       | 9     | 22        | 74·90                        | 1063·7    | 33·71 | 82·40      | 1358·1              | 16·35 |
|              | Bellary ...      | 898                      | 53                  | 893       | 6     | 37        | 59·02                        | 991·4     | 6·68  | 41·20      | 1135·5              | 9·46  |
|              | Total ...        | 2,163                    | 124                 | 2,368     | 31    | 116       | 57·32                        | 1094·8    | 14·33 | 53·62      | ...                 | ...   |
| MYSORE.      | Bangalore ...    | 1,641                    | 68                  | 1,347     | 20    | 59        | 41·43                        | 820·8     | 12·18 | 35·95      | 1233·8              | 12·23 |
|              | Cannanore ...    | 696                      | 28                  | 574       | 5     | 28        | 40·22                        | 821·7     | 7·18  | 40·22      | 1198·1              | 16·76 |
|              | Calicut ...      | 96                       | 2                   | 61        | 3     | 1         | 20·83                        | 635·4     | 31·25 | 10·41      | 1065·6              | 15·29 |
|              | Malliaporum ...  | 93                       | 2                   | 69        | 1     | 5         | 21·50                        | 741·9     | 10·75 | 53·76      | 972·4               | 15·47 |
|              | Total ...        | 2,526                    | 100                 | 2,051     | 29    | 93        | 39·58                        | 811·9     | 11·48 | 36·81      | ...                 | ...   |
| HYDERABAD.   | Secunderabad ... | 2,327                    | 117                 | 2,602     | 34    | 77        | 50·27                        | 1118·2    | 14·61 | 33·09      | 1279·7              | 26·86 |
|              | Kamptee ...      | 909                      | 56                  | 1,390     | 21    | 40        | 61·61                        | 1529·2    | 23·10 | 44·01      | 1733·1              | 16·87 |
|              | Seetabuldee ...  | 50                       | 2                   | 122       | 1     | ...       | 40·00                        | 2440·0    | 20·00 | ...        | 1519·2              | 9·53  |
|              | Total ...        | 3,286                    | 175                 | 4,114     | 56    | 117       | 53·26                        | 1252·0    | 17·04 | 33·61      | ...                 | ...   |
| BURMAH.      | Rangoon ...      | 742                      | 36                  | 750       | 11    | 39        | 48·52                        | 1010·8    | 14·82 | 52·56      | 1292·3              | 12·49 |
|              | Thayetmyo ...    | 674                      | 36                  | 698       | 4     | 27        | 53·41                        | 1035·6    | 5·93  | 40·06      | 1244·8              | 22·51 |
|              | Tonghoo ...      | 457                      | 25                  | 632       | 9     | 36        | 54·70                        | 1382·9    | 19·69 | 78·77      | 962·0               | 15·80 |
|              | Port Blair ...   | 134                      | 3                   | 73        | 1     | 1         | 22·39                        | 544·8     | 7·46  | 7·46       | 922·4               | 11·02 |
|              | Total ...        | 2,007                    | 100                 | 2,153     | 25    | 103       | 49·82                        | 1072·7    | 12·45 | 51·32      | ...                 | ...   |
| DEPÔTS.      | Poonamallee ...  | 150                      | 45                  | 499       | 4     | 8         | 300·00                       | 3326·7    | 26·66 | 53·33      | 2804·5              | 62·02 |
|              | Wellington ...   | 447                      | 40                  | 877       | 16    | 35        | 89·48                        | 1962·0    | 35·79 | 78·30      | 1259·5              | 13·53 |
|              | Ramandroog ...   | 52                       | 3                   | 48        | ...   | 1         | 57·69                        | 923·1     | ...   | 19·23      | 1312·0              | 13·26 |
|              | Total ...        | 649                      | 88                  | 1,424     | 20    | 44        | 135·59                       | 2194·1    | 30·81 | 67·90      | ...                 | ...   |
| ON THE MARCH |                  | 192                      | 11                  | 152       | 13    | ...       | 57·29                        | 791·7     | 67·71 | ...        | 542·6               | 25·13 |

The admissions and deaths in each class and order of diseases, in each of the Military Divisions, are shown in the following Tables, taken from the Returns of the Principal Medical Officer:—

[illegible]

| Divisions                       | Presidency. | Mysore. | Hyderabad. | Burmah. | Depôts.   | On the March. | Presidency. | Mysore. | Hyderabad. | Burmah. | Depôts.   | On the March. |
|---------------------------------|-------------|---------|------------|---------|-----------|---------------|-------------|---------|------------|---------|-----------|---------------|
| Average Strength                | 2,163       | 2,526   | 3,286      | 2,007   | 649       | 192           |             |         |            |         |           |               |
| Ratio per 1,000 of the Strength |             |         |            |         |           |               |             |         |            |         |           |               |
| Diseases.                       | Admitted.   | Died.   | Admitted.  | Died.   | Admitted. | Died.         | Admitted.   | Died.   | Admitted.  | Died.   | Admitted. | Died.         |
| <i>Febrile—</i>                 |             |         |            |         |           |               |             |         |            |         |           |               |
| Eruptive Fevers                 | 193         | 1       | 4          | 1       | 253       | 3             | 2           | 1       | 1          | 1       | 1         | 1             |
| Continued "                     | 87          | 3       | 660        | 15      | 356       | 1             | 7           | 180     | 47         | 1       | 1         | 1             |
| Paroxysmal "                    | 12          | 7       | 7          | 3       | 14        | 5             | 1           | 1       | 1          | 1       | 1         | 1             |
| Cholera "                       | 4           | 3       | 12         | ...     | ...       | ...           | ...         | ...     | ...        | ...     | ...       | ...           |
| Influenza                       | ...         | ...     | ...        | ...     | ...       | ...           | ...         | ...     | ...        | ...     | ...       | ...           |
| Erysipelas                      | ...         | ...     | ...        | ...     | ...       | ...           | ...         | ...     | ...        | ...     | ...       | ...           |
| Other diseases of this Group... | ...         | 4       | 3          | 2       | 1         | 1             | ...         | ...     | ...        | ...     | ...       | ...           |
| Total ...                       | 298         | 8       | 1,024      | 22      | 372       | 3             | 10          | 237     | 1          | 308     | 8         | 4             |
| <i>Constitutional—</i>          |             |         |            |         |           |               |             |         |            |         |           |               |
| Rheumatism                      | 61          | 1       | 89         | ...     | 91        | ...           | 3           | 69      | ...        | 44      | ...       | ...           |
| Syphilis                        | 242         | 126     | 337        | 192     | 22        | 2             | 25          | 17      | 1          | 88      | ...       | ...           |
| Scrofula and Phtisis            | 7           | ...     | 23         | ...     | ...       | ...           | 8           | 3       | ...        | 28      | ...       | ...           |
| Scurvy and Purpura              | ...         | ...     | ...        | ...     | ...       | ...           | ...         | 6       | ...        | 1       | ...       | ...           |
| Anæmia                          | 14          | 2       | 6          | ...     | ...       | ...           | ...         | 4       | ...        | 4       | ...       | ...           |
| Other diseases of this Group... | 2           | 1       | 3          | ...     | 2         | ...           | ...         | 4       | ...        | 2       | ...       | ...           |
| Total ...                       | 326         | 2       | 458        | 278     | 243       | 2             | 36          | 278     | 1          | 167     | 3         | 2             |

*Madras.*

**GENERAL DISEASES.**—The rate of prevalence of diseases of this class is lower than in 1875, in the Presidency Division by 182.7 per 1,000 men, and in the Mysore by 22.2, whilst it is higher in the Hyderabad by 17.1, and in the Burmah by 17.1 per 1,000. In the Presidency, both groups of diseases contributed to the reduction in the rate for the whole class, the rate for the *febrile group* is little more than the half of that of the preceding year; in the Mysore, the reduction is altogether in diseases of the *constitutional group*. In the Hyderabad, the rate of the first group is higher, that of the second is lower, whilst in the Burmah Division, this distribution of the increased rate is reversed. The rate of mortality of the class is higher in every Division except the Burmah, for which it is only a third of that of 1875.

**Eruptive Fevers.**—The only noticeable feature in connexion with fevers of this nature is the re-appearance of dengue, a disease apparently extinct in the Command in the preceding year; the admissions for it were 6, and they all occurred in the Burmah Division, and at the Thayetmyo station there.

**Continued Fevers.**—There is an increased rate of prevalence of fevers of this kind for every Division except the Presidency, which shows a decrease of 154.2 per 1,000 men; the rate of mortality is higher for every Division except the Burmah.

**Enteric Fever.**—Taking all Divisions together, the rate of prevalence of this disease is nearly twice as great as that of the preceding year; as in 1875, its chief incidence was in one, the Hyderabad Division, and in it at Secunderabad, where all the corps serving at the station were attacked, though in different proportions, the two Infantry regiments, the 2nd Battalion 16th (which was in its first year of service in the Command) and the 44th (in its fifth year of service) suffered in a nearly equal degree, in each the features were those of a "house epidemic," but one of no great extent, the first regiment having but 17, the last but 18 admissions. The Cavalry, and the Royal Artillery, suffered in a much less degree. Of the admissions other than those at Secunderabad, the Depôt at Wellington, contributed more than half; a sporadic case of the disease occurred at each of four other stations.

The stations at which there were admissions for enteric fever, and the quarters of the year when they took place, are shown in the following Table:—

| Divisions.           | Stations.        | 1st Quarter. |         | 2nd Quarter. |         | 3rd Quarter. |         | 4th Quarter. |         | Total.      |         |    |
|----------------------|------------------|--------------|---------|--------------|---------|--------------|---------|--------------|---------|-------------|---------|----|
|                      |                  | Admissions.  | Deaths. | Admissions.  | Deaths. | Admissions.  | Deaths. | Admissions.  | Deaths. | Admissions. | Deaths. |    |
| Presidency           | St. Thomas's Mt. | ..           | ..      | ..           | ..      | 1            | 1       | ..           | ..      | 1           | 1       |    |
|                      | Bellary          | ..           | ..      | ..           | ..      | 1            | ..      | ..           | ..      | 1           | ..      |    |
| Hyderabad            | Secunderabad     | 6            | 2       | 2            | 1       | 26           | 8       | 8            | 3       | 42          | 14      |    |
| Burmah               | Thayetmyo        | ..           | ..      | ..           | ..      | 1            | 1       | ..           | ..      | 1           | 1       |    |
| Depôts               | Wellington       | ..           | 1       | ..           | 2       | 2            | 1       | ..           | ..      | 5           | 3       |    |
| Troops on the March  | ..               | ..           | 1       | 1            | ..      | ..           | ..      | ..           | ..      | 1           | 1       |    |
| Total in the Command | ..               | ..           | 8       | 3            | 4       | 3            | 31      | 11           | 8       | 3           | 51      | 20 |



The ages, and periods of residence in India of those attacked by enteric *Mudras* fever, are shown in the following Tables, which are taken from the report of the Principal Medical Officer :—

| Ages.         |    |    |    | Number admitted for Enteric Fever. | Number of Deaths from Enteric Fever. |
|---------------|----|----|----|------------------------------------|--------------------------------------|
| 19 to 20 ..   | .. | .. | .. | 2                                  | ..                                   |
| 20 to 21 ..   | .. | .. | .. | 4                                  | 2                                    |
| 21 to 22 ..   | .. | .. | .. | 5                                  | 2                                    |
| 22 to 23 ..   | .. | .. | .. | 4                                  | 1                                    |
| 23 to 24 ..   | .. | .. | .. | 7                                  | 2                                    |
| 24 to 25 ..   | .. | .. | .. | 9                                  | 5                                    |
| 25 to 26 ..   | .. | .. | .. | 8                                  | 4                                    |
| 26 to 27 ..   | .. | .. | .. | 4                                  | 3                                    |
| 27 to 28 ..   | .. | .. | .. | 3                                  | ..                                   |
| 29 to 30 ..   | .. | .. | .. | 1                                  | ..                                   |
| 33 to 34 ..   | .. | .. | .. | 1                                  | 1                                    |
| 37 to 38 ..   | .. | .. | .. | 2                                  | ..                                   |
| 42 to 43 ..   | .. | .. | .. | 1                                  | ..                                   |
| Total .. .. . |    |    |    | 51                                 | 20                                   |

| Service in India. |    |    |    | Number admitted for Enteric Fever. | Number of Deaths from Enteric Fever. |
|-------------------|----|----|----|------------------------------------|--------------------------------------|
| Under 1 year ..   | .. | .. | .. | 23                                 | 10                                   |
| 1 to 2 years ..   | .. | .. | .. | 2                                  | 1                                    |
| 2 to 3 ..         | .. | .. | .. | 4                                  | 2                                    |
| 3 to 4 ..         | .. | .. | .. | 5                                  | 2                                    |
| 4 to 5 ..         | .. | .. | .. | 13                                 | 2                                    |
| 5 to 6 ..         | .. | .. | .. | 2                                  | 2                                    |
| 6 to 7 ..         | .. | .. | .. | 1                                  | 1                                    |
| 9 to 10 ..        | .. | .. | .. | 1                                  | ..                                   |
| Total .. .. .     |    |    |    | 51                                 | 20                                   |

*Paroxysmal Fevers.*—For every Division except the Presidency there is a decrease in the rate of prevalence of diseases of this nature on that of the preceding year, and in each instance the reduction is considerable; Depôts and Troops on the March, each show an increase.

*Cholera*, appeared in a sporadic form only in the Presidency and in the Hyderabad Divisions, the troops in the Mysore, and the Burmah Division remaining free from the disease. The greatest actual, as well as proportional prevalence, was at Depôts, but this was owing to the development there of cholera in men who had acquired the disease when on the march from Bombay to Wellington Depôt, and who were taken ill after arrival at their destination; in this outbreak 12 men of the 33rd Foot (in a strength of 40) were attacked.

*Rheumatism.*—Compared with the results for the preceding year, all the Divisions show lower rates of prevalence except Burmah, the reduction in the Divisions however is to some extent counterbalanced by an increase for Depôts, and for Troops on the March.

*Syphilis.*—Compared with 1875, there is a decrease in the rate of admissions for this disease of 40·6 per 1,000 men in the Presidency, of 29·5 in the Mysore, and of 17·8 in the Hyderabad Divisions; for the Burmah Division there is an increase of 21·9.

*Scrofula and Phthisis.*—The prevalence of diseases in this group is lower for every Division than in the preceding year, except Mysore, for which there is a small increase.

*Madras.*

**LOCAL DISEASES.**—*Diseases of the Nervous System.*—The rate of admissions for the Presidency, and that for the Mysore Division, differs only fractionally from the corresponding rate of the preceding year, but for the Hyderabad, there is an increase of 11·5, and for the Burmah an increase of 17·6 per 1,000 men; the rate of mortality of the Hyderabad Division is more than threefold higher than in 1875, and that of Burmah is fourfold higher.

*Diseases of the Eye.*—The rate of admissions is lower for the Presidency and for the Mysore Division, but is considerably higher for each of the remaining ones.

*Diseases of the Circulatory System.*—Compared with the preceding year, the rate of admissions differs only fractionally in the Presidency, and in the Burmah Divisions, and it is lower for the Mysore, and for the Hyderabad; in the instance of Mysore, the decrease amounts to 28·1 per 1,000 men, or more than sixfold; this result is due to the decreased prevalence of palpitation.

*Diseases of the Respiratory System.*—Compared with 1875, there is an increased rate of admissions for the Presidency, a lower rate for each of the others.

*Diseases of the Digestive System.*—The rate of admissions is higher than in the preceding year for the Presidency by 69· per 1,000 men, and for the Burmah by 69·4, for the Mysore Division, it is lower by 36·9, for the Hyderabad by 35·3, for Depôts there is a large increase, 280·3 per 1,000 men. The rate of mortality is fractionally lower for the Presidency, and for the Hyderabad is lower by 3·23, or one-half; the Mysore and the Burmah Divisions, each show an increase, the first amounting to 2·31 and the last to 2·12; for Depôts there is a decrease of 6·19 per 1,000 men.

The relative prevalence of certain important diseases of this order, in each Division of the Command, is shown in the following Table :—

| Divisions.                                | Ratio per 1,000 of the Strength. |       |           |       |            |       |           |       |           |       |                      |       |
|-------------------------------------------|----------------------------------|-------|-----------|-------|------------|-------|-----------|-------|-----------|-------|----------------------|-------|
|                                           | Presidency.                      |       | Mysore.   |       | Hyderabad. |       | Burmah.   |       | Depôts.   |       | Troops on the March. |       |
|                                           | Admitted.                        | Died. | Admitted. | Died. | Admitted.  | Died. | Admitted. | Died. | Admitted. | Died. | Admitted.            | Died. |
| Dysentery ... ..                          | 46·70                            | ·92   | 51·1      | ·39   | 54·8       | 1·22  | 103·6     | 3·48  | 98·6      | 1·54  | 93·8                 | 5·21  |
| Diarrhoea ... ..                          | 46·70                            | ...   | 43·2      | ...   | 58·4       | ...   | 71·2      | ·50   | 15·0      | ...   | 72·9                 | ...   |
| Hepatitis, including abscess of liver ... | 78·1                             | 1·85  | 37·2      | 4·32  | 49·3       | 1·83  | 64·8      | ...   | 229·6     | 3·09  | 52·1                 | 10·42 |

The relation between the prevalence and mortality of the diseases specified, and season, is shown in the following Table :—

|             | Hepatitis, including Abscess of the Liver. |       |                              | Dysentery. |       |                              |       | Diarrhea. |       |                              |       | Total.    |       |                              |      |
|-------------|--------------------------------------------|-------|------------------------------|------------|-------|------------------------------|-------|-----------|-------|------------------------------|-------|-----------|-------|------------------------------|------|
|             | Number.                                    |       | Ratio per 1,000 of Strength. | Number.    |       | Ratio per 1,000 of Strength. |       | Number.   |       | Ratio per 1,000 of Strength. |       | Number.   |       | Ratio per 1,000 of Strength. |      |
|             | Admitted.                                  | Died. |                              | Admitted.  | Died. | Admitted.                    | Died. | Admitted. | Died. | Admitted.                    | Died. | Admitted. | Died. |                              |      |
| 1st Quarter | 147                                        | 6     | 14.0                         | 129        | 8     | 12.3                         | .76   | 95        | 1     | 9.1                          | .10   | 371       | 15    | 35.4                         | 1.43 |
| 2nd "       | 162                                        | 6     | 14.7                         | 154        | 2     | 13.9                         | .18   | 216       | ..    | 19.6                         | ..    | 532       | 8     | 48.2                         | .72  |
| 3rd "       | 195                                        | 9     | 17.8                         | 220        | 6     | 20.1                         | .55   | 221       | ..    | 20.2                         | ..    | 636       | 15    | 58.1                         | 1.37 |
| 4th "       | 200                                        | 6     | 18.5                         | 197        | 8     | 18.2                         | .74   | 124       | 1     | 11.5                         | .09   | 521       | 15    | 48.2                         | 1.39 |

*Diseases of the Urinary System.*—Compared with the preceding year, the rate of admissions is higher for the Presidency, and for the Hyderabad Divisions, but is lower for the others.

*Poisons.*—The rate of admissions is higher in all the Divisions, except the Burmah, the rate of which is only one-half of that of 1875; two of the admissions were due to the effects of carbolic acid, both illnesses were fatal. Two admissions were on account of poisoning by a vegetable irritant. One admission was due to the bite of a cobra, the soldier recovered; the cobra was one belonging to jugglers, the poison fangs of which had been extracted before the snake-charming performances were exhibited.

*Injuries.*—*Accidental.*—The rate of admissions is higher than in the preceding year for the Presidency, but is lower for each of the other Divisions.

The principal results of sickness, for each Corps serving in the Command, are shown in the following Table:—

Madras.

| Corps.                                  | Years of Service in the Command. | Average Annual Strength. | Admitted into Hospital. | Deaths.         |              | Average Number of Daily Sick. | Ratio per 1,000 of Strength of |                            |         |           | Average Sick time to each Soldier. | Average duration of Sick-ness. | Stations.                                       |
|-----------------------------------------|----------------------------------|--------------------------|-------------------------|-----------------|--------------|-------------------------------|--------------------------------|----------------------------|---------|-----------|------------------------------------|--------------------------------|-------------------------------------------------|
|                                         |                                  |                          |                         | In the Command. | Of Invalids. |                               | Invalids.                      | Admissions into Hos-pital. | Deaths. | Invalids. |                                    |                                |                                                 |
| CAVALRY.                                | ..                               | 395                      | 392                     | 3               | ..           | 14                            | 992.4                          | 7.59                       | 35.44   | 54.81     | Days. 20.03                        | Days. 20.19                    | On the March, 4 <sup>th</sup> , Bangalore, 104. |
|                                         | { over 10                        | 419                      | 352                     | 4               | 1            | 15                            | 840.1                          | 11.93                      | 35.80   | 31.51     | 11.50                              | 13.69                          |                                                 |
|                                         | Total Cavalry..                  | ..                       | 814                     | 744             | 7            | 1                             | 29                             | 914.0                      | 9.83    | 35.62     | 42.85                              | 15.64                          | 17.11                                           |
| ROYAL ARTILLERY.                        | ..                               | 167                      | 203                     | 5               | ..           | 9                             | 1213.2                         | 29.94                      | 56.60   | 68.44     | 24.98                              | 20.52                          | Bangalore, 12.                                  |
| 11th.-Qrs. and C Batt. C Brig. R.H.A.   | ..                               | 156                      | 253                     | 4               | ..           | 11                            | 1621.8                         | 25.64                      | 70.51   | 80.64     | 29.43                              | 18.15                          | Secunderabad, 12.                               |
| B Batt. " "                             | ..                               | 106                      | 126                     | 4               | ..           | 4                             | 1188.7                         | 37.74                      | 37.74   | 53.60     | 19.56                              | 16.54                          | St. Thomas's Mount, 12.                         |
| 11th.-Qrs. and 4th Batt. 5th Brig. R.A. | 2                                | 89                       | 151                     | 1               | ..           | 9                             | 1696.6                         | 11.23                      | 101.12  | 96.18     | 35.16                              | 20.69                          | Cananore, 14; Tonghoo, 94; on the March, 14.    |
| 1st Batt. " "                           | ..                               | 97                       | 107                     | 1               | ..           | 6                             | 1103.1                         | 10.31                      | 61.85   | 63.81     | 23.29                              | 21.12                          | Secunderabad, 12.                               |
| 2nd " "                                 | ..                               | 78                       | 70                      | 1               | ..           | 2                             | 897.4                          | 12.82                      | 25.64   | 43.97     | 16.05                              | 17.88                          | Rangoon, 12.                                    |
| 5th " "                                 | ..                               | 84                       | 76                      | 2               | ..           | 2                             | 904.7                          | 23.81                      | 23.81   | 53.33     | 19.47                              | 21.52                          | Tonghoo, 1; Cananore, 94; on the March, 14.     |
| 6th " "                                 | ..                               | 91                       | 158                     | 5               | ..           | 3                             | 1736.3                         | 54.94                      | 32.97   | 75.28     | 27.47                              | 15.82                          | Tonghoo, 12.                                    |
| 7th " "                                 | ..                               | ..                       | ..                      | ..              | 1            | ..                            | ..                             | ..                         | ..      | ..        | ..                                 | ..                             |                                                 |
| Invalid of the Brigade                  | ..                               | 88                       | 98                      | 1               | ..           | 5                             | 1113.6                         | 11.36                      | 56.82   | 68.30     | 24.93                              | 22.38                          | Rangoon, 12.                                    |
| 7th Batt. 6th Brig. R.A. ..             | ..                               | 151                      | 166                     | 1               | ..           | 2                             | 1099.3                         | 6.62                       | 13.24   | 61.13     | 22.31                              | 20.29                          | Secunderabad, 12.                               |
| A Batt. 9th Brig. R.A. ..               | ..                               | 149                      | 138                     | 1               | ..           | 6                             | 926.2                          | 6.71                       | 40.26   | 54.83     | 20.01                              | 21.61                          | Bangalore, 12.                                  |
| C " " " " ..                            | ..                               |                          |                         |                 |              |                               |                                |                            |         |           |                                    |                                |                                                 |

[illegible]

*Madras.*

§ Left 8th March.

‡ Arrived 10th March.

† Left on 4th Jan.

\* Arrived 8th Feb.

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The relation between length of service in the Command, and the results of sickness in each Corps, are shown in the following Table :—

| Corps.                                                                                              | Year of Service in the Command. | Average Annual Strength. | Admitted into Hospital. | Died in and out of the Command. | Invalided. | Average Number of Constantly Sick. | Ratio per 1,000 of Strength. |       |            | Average Sick Time to each Soldier. | Average duration of each case of Sickness. |                  |
|-----------------------------------------------------------------------------------------------------|---------------------------------|--------------------------|-------------------------|---------------------------------|------------|------------------------------------|------------------------------|-------|------------|------------------------------------|--------------------------------------------|------------------|
|                                                                                                     |                                 |                          |                         |                                 |            |                                    | Admissions into Hospital.    | Died. | Invalided. |                                    |                                            | Constantly Sick. |
| 14th Hussars...<br>2nd Bat. 16th Foot ...                                                           | Under 1 year                    | 1,137                    | 1,112                   | 20                              | 30         | 59.44                              | 978.6                        | 17.59 | 26.39      | 52.28                              | 19.08                                      | 19.57            |
| 33rd Foot ...                                                                                       | 1                               | 789                      | 1,155                   | 22                              | 21         | 48.08                              | 1463.9                       | 27.88 | 26.61      | 60.94                              | 22.23                                      | 15.19            |
| C Brig. Royal Horse Artillery ...                                                                   | 3                               | 323                      | 456                     | 9                               | 20         | 24.01                              | 1411.8                       | 27.86 | 61.92      | 74.34                              | 27.13                                      | 19.22            |
| 43rd Foot ...<br>45th " ...<br>48th " ...<br>67th " ...                                             | 4                               | 3,502                    | 3,169                   | 43                              | 135        | 152.63                             | 904.9                        | 12.25 | 38.55      | 43.58                              | 15.62                                      | 17.26            |
| 44th Foot ...<br>89th " ...                                                                         | 5                               | 1,669                    | 2,238                   | 23                              | 114        | 101.56                             | 1340.9                       | 13.74 | 68.30      | 60.85                              | 22.21                                      | 16.56            |
| 7th Batt. 6th Brig. Royal Artillery ...<br>9th Brig. Royal Artillery ...<br>1st Batt. 21st Foot ... | 7                               | 1,519                    | 1,533                   | 25                              | 65         | 85.16                              | 1009.2                       | 16.46 | 42.79      | 56.06                              | 20.46                                      | 20.27            |
| 5th Brig. Bl. Artillery                                                                             | 9                               | 515                      | 688                     | 15                              | 26         | 35.19                              | 1262.4                       | 27.52 | 47.71      | 64.48                              | 23.57                                      | 18.67            |
| 16th Lancers ...<br>20th Brigade Royal Artillery ...<br>76th Foot ...                               | over 10 years                   | 1,615                    | 1,865                   | 27                              | 67         | 76.46                              | 1154.8                       | 16.72 | 41.48      | 47.81                              | 17.28                                      | 14.96            |

#### Officers.

In an annual average strength of 409 officers, there were 309 attacks of illness, and 7 deaths, being in the rates of 755.5 and of 17.11 per 1,000 of the strength respectively.

34 officers were invalided, being in the proportion of 83.13 of the strength.

The deaths were due to cholera (1), apoplexy (2), valve disease of the heart (1), dysentery (1), rupture of viscera from a fall (1), and one death by a gun shot, was suicidal.

#### Women.

In an average annual strength of 1,413 wives of non-commissioned officers and men, there were 1,123 admissions into hospital, and (in the Command) 28 deaths, being in the rates of 794.7 and of 19.82 per 1,000 of the strength respectively ; both rates exceed those of the preceding year.

The diseases which caused most admissions were fevers, conjunctivitis, diarrhoea, dysentery, hepatitis, and debility, more than a quarter of the whole being for the last named condition. There were 23 admissions for abortion, and (not included in those for disease) 298 for childbirth.

The deaths were caused by enteric fever (3), remittent fever (1), cholera (9), pyæmia (1), general dropsy (1), encephalitis (1), disease of the mastoid cells (1), dysentery or diarrhoea (6), debility (2), and three deaths were consequent on the puerperal state.

*Children.*

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In an average annual strength of 2,833 children of non-commissioned officers and men, there were 1,685 admissions into hospital, and 170 deaths (in the Command), being in the rates of 59·47, and of 60·01 per 1,000 of the strength respectively; the rate of admissions is higher but not importantly, than in the preceding year; the rate of deaths is 5·99 per 1,000 higher.

142 admissions were due to eruptive fevers, measles for the most part; there were 2 admissions for dengue. For enteric fever there were 4, and for other forms of continued fevers 172 admissions; for paroxysmal fevers 49 admissions; for cholera 10; pulmonary consumption caused 2; and mesenteric tabes 22 admissions; 226 admissions were on account of conjunctivitis.

The deaths were due to measles (4), enteric fever (1), simple continued fever (3), remittent fever (2), cholera (7), whooping cough (1), scrofula (4), tubercular meningitis (4), consumption (1), tabes mesenterica (12), anæmia (1), meningitis (2), hydrocephalus (2), convulsions (39), epilepsy (1), disease of heart (2), nævus (1), bronchitis (11), pneumonia (2), teething (23), quinsy (1), enteritis (1), dysentery (8), diarrhoea (21), jaundice (1), debility (12), poisoning (1), drowning (1), concussion of brain (1).

## SANITARY REPORT.

Surgeon-General C. A. Gordon, C.B., reports, that the occurrence of several cases of cholera, enteric fever, and sunstroke, renders the statistics of 1876 less favourable than they otherwise would have been. Considering the alarming prevalence of cholera among a famine-stricken population throughout a great part of the Presidency, and the presence of smallpox in an epidemic form among the same class, the health of the troops has been satisfactory. Cholera is officially reported to have caused 148,193 deaths, and smallpox 23,469 deaths, among the native population during the year. The death-rate of British Troops—15·63 per mille of strength—exceeds that of 1875 by 1·12, the admission-rate is slightly greater, the daily sick-rate a little less, while the numbers invalided amounted to 42·94 per mille of strength against 52·79 in previous year, or, if calculated as in 1875, viz., by the number of invalids embarked during the year, irrespective of the year in which they passed Boards, the ratio amounts to 43·66 per mille of strength, showing a decrease of 9·13 as compared with 1875.

The sanitary condition of barracks, hospital accommodation, water supply, drainage, conservancy, and other details connected with the health of the troops, will be considered according to circles, and to the report on each circle will be appended a statement of improvements which have been effected during the year, as well as one of those proposed, but not yet carried out.

*Climate.*—At Madras, the mean temperature for the year was 83°·4. The rainfall—21·60 inches—was remarkably scanty. This scarcity, however, was not confined to Madras, but prevailed throughout the Presidency generally, producing a wide-spread famine and great distress among the native population. The health of the troops was not affected thereby, the supply of water throughout the year being sufficient for their requirements. At Bellary, the season was exceptionally dry, the rainfall equalled 7 inches only, being less than the average by 10 inches. The mean annual temperature was 81°·4.

This station still maintains its good name for healthiness, the 43rd Regiment, quartered here, having the smallest death-rate in the Command, viz., 4·56 per mille of strength. But for the prevalence of venereal disease, their admission-rate, too, would have been small.

At Ramandroog, the mean annual temperature was 74°·3. The rainfall equalled 15·69 inches only. This station is favourably spoken of for carefully selected cases, its chief advantages appearing to consist in its proximity to Bellary, admitting of frequent changes of troops being readily effected.

*Barracks.*—Fort St. George.—These have undergone no change during the year. The garrison consisted of the head quarters 67th Regiment and a detachment of Royal Artillery. The quarters occupied were approved of with the

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exception of the casemated barracks allotted to the unmarried men Royal Artillery, which by reason of faulty position and defective ventilation were considered unsatisfactory. The health of the men did not apparently suffer from residence therein.

**St. Thomas's Mount.**—The quarters in use were identical with those occupied in 1875, and met all requirements. With the exception of some minor improvements connected with the ventilation of the guard-rooms and cells, there is no change to record.

**Pallaveram.**—The barracks here have been kept in good sanitary condition, and no changes requiring comment have occurred. They were only in occupation between October, 1876, and April, 1877, during the annual course of rifle instruction.

**Poonamallee.**—The same quarters were in occupation as in previous year. The construction and plan of the buildings is obsolete and faulty, and the ventilation defective. The erection of new barracks has been sanctioned, and the digging of the foundations was actually commenced, but delay is caused by want of the necessary funds.

**At Bellary**, two new barrack blocks were completed for the Infantry and taken into use in April. Several minor improvements in connection with the drainage were effected. A recreation and canteen-room for the Infantry was commenced, and quarters for the Native Hospital Establishment are in course of construction.

**Hospital Accommodation.**—At all stations in the Circle, the buildings in occupation were the same as in 1875. At Madras, Government sanctioned the watering of the streets in front of the hospital during the latter half of the year, and the comfort of the sick was much increased thereby.

**At Poonamallee**, the erection of a new hospital to accommodate 90 men was commenced on 4th September, 1876, and will, it is expected, be completed by January, 1878. The estimated cost is Rs. 102,000. At Trichinopoly, the hospital has been re-roofed, the walls heightened, and verandahs constructed. Plans and estimates for an infectious disease ward in connection with it were submitted for approval in November, 1876.

**Water Supply.**—No change has occurred in the source, and, notwithstanding the scanty rainfall, the supply has been adequate for all purposes. That for drinking is carefully filtered prior to use. Macnamara filters, as well as those of the old three-chatty pattern, being employed for this purpose. It has been proposed to substitute an iron pipe for the masonry conduit leading from the artesian well at Bellary to Barracks, and to construct a cistern at Ramandroog for the storage of water, the source of supply at that station being at a considerable distance from barracks, and means of conveyance being available only morning and evening.

**Drainage.**—At Fort St. George, these are chiefly open stone channels for removal of surface water. In a few places they are covered and trapped. On several occasions during the year much annoyance was caused by the offensive odours emanating from the large public drain situated to the north of the fort. Steps have been taken by the municipality to remedy this evil, and apparently with benefit.

Elsewhere the drainage is surface only, and has met all requirements. At Bellary it has been improved by the laying down of masonry drains from the ablution-rooms.

**Conservancy.**—The dry-earth system is now in force at all stations both in barracks and hospitals.

**Cooling of Barracks.**—Punkahs and Kus-Kus tatties are in use for this purpose.

**Lighting.**—The barracks at Fort St. George are lit with gas. Elsewhere oil is in use both in barracks and hospitals.

The introduction of kerosine oil is still delayed for the want of lamps.

**Improvements.**—Fort St. George.—Municipal arrangements made for removing an offensive nuisance from the public drain.

**St. Thomas's Mount.**—Ventilation of guard-rooms much improved.

**Poonamallee.**—A new hospital, to accommodate 90 men, commenced on 4th September, 1876.

**Bellary.**—Surface drains provided for removal of refuse water. Two new



barrack blocks completed and taken into occupation. Recreation and canteen *Madras*. for Infantry, in course of construction (temporarily stopped for want of funds). 32 Quarters for Native Hospital Establishment, in course of construction. Catch-pits to lavatories removed, and refuse water carried to surface drains.

Some minor improvements carried out in the barracks and hospitals at Trichinopoly, Ramandroog, and Bellary.

*Climate*—*MYSOKE CIRCLE*.—The past year was unusually dry, the rainfall at Bangalore amounting to 17.16 inches only, while at Cananore it barely reached 100 inches, the average annual fall at that station ranging from 120 to 140 inches.

This scarcity has been attended with disastrous results, similar to those already noted in connection with the Presidency Circle.

*Barracks*.—Considered satisfactory at all stations. At Calicut part of the barracks have been re-floored, while at Malleapoorum all the barracks have been similarly repaired, and two quarters for officers completed and handed over. At no station, except Wellington, are the barracks double-storeyed. At the latter a new block of quarters to accommodate 148 men has been completed. Up to 31st December, 1876, it was not in occupation.

*Hospitals*.—The same buildings were in use as noted in previous year. With the exception of the Infantry hospital at Bangalore, they are considered satisfactory. The Infantry hospital is obsolete, but there would be a difficulty in securing a suitable site for another. The occupation of the new barrack block at Wellington will necessitate increased hospital accommodation, the extent of which is not yet determined. It has been proposed to convert the Civil Lock Hospital into a female hospital, and to hand over the wards now used for women and children for the sole use of the men. This matter is still under consideration. A new mortuary was erected at Malleapoorum during the year.

*Water Supply*.—At Bangalore the source is two-fold, viz., from wells, and from the Ulsoor Tank. At Wellington, that used for drinking is obtained from springs, the supply is equal to 380 gallons per hour, much of which runs to waste. It has been recommended that an iron pipe be substituted for the masonry one now in use, and that a reservoir be built to contain a week's supply. The water used for ablution purposes at this station is collected from the hill sides, and stored in a large masonry reservoir holding 220,000 gallons. It is conveyed to barracks through pipes, and laid on by tap wherever required.

At all stations the supply has been sufficient for the wants of the troops.

*Drainage*.—At Bangalore the drainage of barracks generally was much improved. Some minor improvements in connection with the drainage at Cananore and Wellington were also effected during the year.

*Conservancy*.—Calicut and Malleapoorum excepted, the dry-earth system in a modified form is now adopted at all stations, both in barracks and hospital.

At Cannanore iron pans have been substituted for wooden ones, and iron receptacles specially constructed for the removal of the excreta in carts were supplied during the year. The soil is now buried inland. Formerly it was thrown over the cliff. Malleapoorum has made a slight advance during the year, the dry-earth plan having been introduced into hospital. Latrines for officers on the same system were constructed at this station, also accommodation for servants and native followers on the same plan. At Bangalore the plan of removing the urine in wooden barrels is considered objectionable, as they emit an offensive smell. Air-tight iron vessels have been suggested for this purpose.

*Baths and Lavatories*.—These were on the whole satisfactory. At Bangalore all corps possess plunge baths. At Cananore one is already provided for the Royal Artillery. One for the Infantry, to contain sea water, is in course of construction.

The scarcity of water throughout the year has prevented these plunge baths from being used to the extent they otherwise would have been.

*Amusements*.—These comprised the usual out and in-door games indulged in at most stations. The Cavalry at Bangalore have an open-air gymnasium, and athletic exercises, tent pegging, fencing, &c., are largely practised. There is also an athletic club, where once a week the different corps in garrison

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compete. A new recreation-room has been provided for the Infantry at Bangalore, and is much appreciated. At Wellington, soldiers' gardens are cultivated, and arrangements made with the Commissariat to receive the produce at market rates for issue to the troops.

Good vegetables are thus secured, and the soldiers at the same time recompensed for their labours. The efforts of the men are further stimulated by the annual distribution of prizes for the best kept gardens and samples of produce.

*Improvements*.—Bangalore.—New drains constructed in Royal Horse Artillery lines. Sergeants' mess-room, Royal Horse Artillery barracks, enlarged. Surface drainage in barracks generally much improved. New canteen and recreation-room handed over to the Infantry. Iron urinals supplied to Infantry.

Wellington.—New block of barracks completed.

Cananore.—Iron pans supplied for dry-earth conservancy instead of wooden tubs. Specially constructed carts supplied for removing night-soil. The latter buried instead of thrown over the cliff. Covered ways to latrines erected in Infantry barracks. Trees planted round hospital and family quarters. Covered drains converted into open ones. New canteen for Infantry taken into use. Swimming-bath in course of construction. New guard and lock-up rooms occupied by the Artillery.

Malleapoorum.—Barrack newly floored. Soil buried instead of being thrown into the river. Dry-earth system introduced into hospital. Latrines (dry-earth) for officers constructed. A new dead-house erected. The wells supplying drinking and ablution water cleaned out. Officers' quarters erected.

Cananore.—New ablution-rooms and guard-room in contemplation.

*Climate*.—HYDERABAD CIRCLE.—At Secunderabad the hot season set in comparatively early; the rainfall during the south-west monsoon was much below the average, while the north-east monsoon failed completely, the result being a serious scarcity of water throughout the country, and great distress among the native population from failure of crops and loss of cattle.

The supply of water for the troops was sufficient, and, with the exception of a diminution in the allowance for plunge baths, they suffered no privation. The mean annual temperature was 82°·9. The total rainfall amounted to 15·47 inches, being less than in previous year by 3°·81 inches, and about 15 inches under the average annual fall. At Kamptee the hot season was excessively trying. On certain days in May and June the thermometer indicated 118° in the shade, and cases of sunstroke were frequent.

The highest recorded temperature in the shade was 122° in May, the lowest 35° in February. The mean for the year was 78°·64. The total rainfall equalled 39·32 inches. On 4th September, the safety of the cantonment was imperilled by a disastrous flood, which utterly ruined the European bazaars, and is stated to have left 9,000 natives houseless.

*Barracks*.—With the exception of some additional buildings erected in the new Cavalry lines, North Trimulgherry, the troops occupied the same quarters as in last year. On 4th August, another barrack block was completed for the Cavalry and handed over for occupation. The lower story of this building had been in occupation since 24th March, 1876, the occupants having been previously accommodated in the verandahs of the adjoining blocks.

Several other buildings were also completed and handed over for the Cavalry, viz., a picket guard room and stabling for a squadron. A field officer's quarters, a range of quarters for subalterns, a plunge bath, and additional stabling for two squadrons are in course of construction.

The Cavalry quarters are double-storeyed; so, too, are part of those occupied by the Artillery; but no difference was observable in the health of men occupying upper and lower rooms. At Kamptee three of the Infantry blocks were enlarged and improved in ventilation. The remainder are gradually to be remodelled on the same plan.

*Hospitals*.—No change has occurred since last year in the buildings occupied, and, with the exception of the Infantry who are located under the same roof, each corps has its own separate hospital.

*Water Supply*.—This is derived from numerous wells. In several, owing to the scanty rainfall, the supply ran short, but by judicious arrangements no

corps suffered any privation, the supply being equal to all ordinary requirements. The use of plunge baths had however to be discontinued. *Madras.*

**Drainage.**—Almost entirely surface. In the Infantry lines the waste water from the ablution-rooms is directed into the soldiers' gardens and used for irrigation purposes. At Kamptee, the swampy piece of ground referred to in last year's report was in process of being drained when the floods set in, and temporarily arrested the progress of the work.

**Conservancy.**—At Secunderabad, the modified dry earth system is carried out both in barracks and hospitals, with the exception of the barracks and hospital Royal Artillery, and the barracks of 2nd Battalion 16th Regiment.

The excreta is carefully removed and buried over a mile from barracks. In the male hospital 2nd Battalion 16th Regiment, the latrine has been improved by the construction of a latticed window. At Kamptee, the modified dry-earth system is effectually carried out in the Infantry barracks, but not in those of the Royal Artillery. Both corps have adopted it in hospital. At Seetabuldee, it is in use both in barracks and hospital.

**Improvements effected in 1876.**—Secunderabad. — 16th Lancers. No. 4 barrack block with offices completed and handed over on 4th August. Picket guard-room completed and occupied on 9th June. Excellent stabling for one squadron completed. Main well protected by a corrugated iron hood placed on iron supports. A pumping apparatus and cistern to hold 1,200 gallons provided for same well. Well on west front of barracks deepened and faced with stone.

Kamptee.—Three Infantry barrack blocks enlarged and improved in ventilation. These alterations are stated to have lessened the temperature three degrees during the hot season. Spirit issue-room of canteen enlarged and ventilation improved. Six of the twelve cells in use with the Infantry have been thatched with a view to rendering them cooler.

Seetabuldee.—Several minor details carried out for improvement of ablution-rooms. A roomy and well-ventilated cell provided for prisoners.

**Climate.**—The chief points of interest in the climate of the different stations in the Burmah Circle, are noted in the following Table :—

| Stations.     | Mean Annual Temperature. | Highest Monthly Mean. | Lowest Monthly Mean. | Rainfall. |         |
|---------------|--------------------------|-----------------------|----------------------|-----------|---------|
|               |                          |                       |                      | Days.     | Inches. |
| Rangoon ..    | 85°·80                   | April, 87°·6          | Dec., 71°·65         | 151       | 97·30   |
| Thayetmyo ..  | No instruments           | .. ..                 | .. ..                | ..        | ..      |
| Tonghoo ..    | 80°·86                   | April, 88°·95         | Dec., 70°·54         | 130       | 69·78   |
| Port Blair .. | No instruments           | .. ..                 | .. ..                | ..        | ..      |

**Barracks.**—At Rangoon, the same buildings were in use as in previous years. Two new bungalows for the Infantry, each capable of accommodating 100 men were completed during the year; a third one is in course of construction. The married quarters of the Infantry are old, condemned, and reported to be out of repair, while those of the Artillery are said to be satisfactory in all respects. New cook-houses were provided for the latter during the year.

At Thayetmyo no change occurred in the quarters occupied. The wooden hut now occupied by a small detachment of the Royal Artillery in the redoubt, will be disused when the new quarters in the entrenchment are completed. The latter is to be single-storeyed, and will accommodate 80 men. At Tonghoo and Port Blair no changes requiring comment are recorded.

**Hospital Accommodation.**—At Rangoon, there has been no change in the buildings occupied. The Artillery and Infantry possess separate hospitals. The construction of new hospitals is said to be in contemplation. At Thayetmyo the sick of Artillery and Infantry are both accommodated in the same building. Although called a Station Hospital it is so in name only, the two corps being under separate medical charge, although accommodated under the same roof. The size of the building being barely sufficient for the accommodation of the

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sick, some rooms not originally intended for wards have been used as such, and are rather defective in ventilation, but there has been no overcrowding, any sick over the regulation number being placed in an unoccupied barrack temporarily utilised as a supplemental hospital. The erection of a few subsidiary buildings, as apothecary's and sergeants' quarters, would do away with the necessity for using this supplemental building. The various offices connected with the hospital are reported satisfactory, with the exception of the mortuary, which is considered too small and too near the public road. Several minor improvements have been effected during the year, and are detailed in the abstract.

At Tougnoo and Port Blair there have been no changes requiring notice.

*Water Supply.*—Obtained from wells at all stations. At Rangoon, water for ablutionary purposes is occasionally drawn from a tank. At Thayetmyo a scheme for supplying water from the Irrawady was in contemplation some time ago, but no steps appear to have been taken to carry it out. The supply everywhere has been sufficient and the quality good.

*Conservancy.*—The modified dry-earth system is carried out at some stations only, viz., in the Infantry barracks and in all hospitals at Rangoon, at Thayetmyo in the Artillery barracks only, whilst at Tougnoo it is adopted in all barracks but not apparently in hospital. Scarcity of labour and financial consideration appear to delay its general introduction. Elsewhere the old system is still pursued.

*Improvements.*—Rangoon.—Ground in vicinity of Infantry barracks in process of levelling to form a parade-ground; drainage from Royal Artillery barracks cook-house improved; Infantry barracks for 100 men each, with washhouses, &c., completed during the year; a similar barrack in course of construction, another Infantry barrack, female hospital for Royal Artillery, and quarters for medical subordinates are to be commenced in 1877.

*Improvements recommended.*—New barracks for the Troops, to replace the old ones still in occupation; new hospitals; repair of flooring of Artillery barrack; latrines; removal of ablution rooms from beneath Infantry barracks.

Several minor improvements in barracks and hospitals have been carried out during the year in Thayetmyo and Tougnoo.

Introduction of dry-earth system into barracks and hospital; a new mortuary, the present one being too small and too near the public road; and several minor alterations and repairs both in barracks and hospitals.

*Improvements recommended.*—Port Blair.—Four new boats for the use of the men; erection of a gymnasium, fives' court, and skittle alley; window to be placed in the "solitary cell" to improve the ventilation.

*Venernal Disease.*—The admission rate from this disease, including all varieties, primary and constitutional combined, shows a decided increase as compared with 1875, the ratios for the two years being 89·20 and 108·16 respectively. The mortality, too, was less, viz., 1 against 5, or a ratio of ·09 against ·45 per mille of strength.

The following Table has been prepared to show the prevalence of syphilis at the different stations in the Command during each of the five years 1872-76. The year in which Lock Hospitals were established is also stated:—

|                                          | Ratio of Admission for Syphilis per 1,000<br>of Strength. |        |        |        |        |
|------------------------------------------|-----------------------------------------------------------|--------|--------|--------|--------|
|                                          | 1876.                                                     | 1875.  | 1874.  | 1873.  | 1872.  |
| <b>Where Lock Hospitals existed:—</b>    |                                                           |        |        |        |        |
| Madras .. .. .                           | 89.62                                                     | 135.66 | 69.77  | 62.77  | 67.57  |
| Saint Thomas's Mount .. .. .             | 58.65                                                     | 100.82 | 76.27  | 42.86  | 97.99  |
| Trichinopoly .. .. .                     | 29.96                                                     | 101.32 | 63.75  | 41.23  | 64.51  |
| Bellary .. .. .                          | 174.83                                                    | 201.76 | 305.36 | 266.52 | 224.18 |
| Bangalore.. .. .                         | 39.10                                                     | 91.73  | 133.33 | 89.23  | 89.32  |
| Cananore .. .. .                         | 76.15                                                     | 39.34  | 47.54  | 17.41  | 14.69  |
| Wellington .. .. .                       | 76.06                                                     | 149.11 | 67.94  | 98.43  | 24.52  |
| Secunderabad .. .. .                     | 110.87                                                    | 116.21 | 43.83  | 55.97  | 119.19 |
| Kamptee .. .. .                          | 81.41                                                     | 132.34 | 290.45 | 132.33 | 87.09  |
| Seetabuldee .. .. .                      | 100.00                                                    | 65.22  | 282.61 | 21.28  | 212.77 |
| Rangoon .. .. .                          | 107.82                                                    | 100.65 | 65.37  | 84.41  | 98.57  |
| Thayetmyo .. .. .                        | 56.38                                                     | 39.71  | 32.45  | 23.98  | 21.35  |
| Tonghoo .. .. .                          | 126.91                                                    | 50.96  | 111.76 | ..     | ..     |
| <b>Where no Lock Hospitals existed:—</b> |                                                           |        |        |        |        |
| Tonghoo .. .. .                          | ..                                                        | ..     | ..     | 91.68  | 71.12  |
| Pallaveram .. .. .                       | ..                                                        | 32.26  | 36.36  | 31.58  | ..     |
| Poonamallee .. .. .                      | 326.67                                                    | 250.00 | 135.30 | 171.87 | 285.71 |
| Ramandroog .. .. .                       | 96.15                                                     | 463.41 | 418.61 | 42.55  | 43.47  |
| Calicut .. .. .                          | 83.33                                                     | 141.41 | 20.40  | 121.95 | 56.82  |
| Malleapoorum .. .. .                     | 10.75                                                     | 52.08  | ..     | 37.59  | 10.31  |
| Port Blair.. .. .                        | 44.73                                                     | 102.36 | ..     | 19.60  | 43.86  |

Compared with 1875, syphilis (embracing all its varieties) has notably decreased at every station in the Presidency Circle, likewise at all in the Mysore Circle, with the exception of Cananore; also in the Hyderabad Circle, particularly at Kamptee.

In the Burmah Circle, an increase is noted at all stations, particularly at Thayetmyo.

The total admissions for primary syphilis and gonorrhœa combined are less than in 1875, the respective ratios being 134.56 and 145.10 per mille of strength.

These good results were attributed to the working of the Act, which appears not only to have lessened disease, but to have rendered the type less virulent.

No special arrangements or facilities exist at any station for nightly private ablution. In a memorandum submitted by me to Government on May 5th, 1876, in connection with this subject, I suggested that means for private ablution should be provided in all registered brothels, and that in barracks "Acton's Jets" should be fixed, all soldiers arriving after hours being marched direct to the ablution-room before being permitted to go to bed.

*Bombay.*

## II.—BOMBAY.

The average annual strength of the non-commissioned officers and men in the Bombay Command was 10,362; the admissions into hospital were 13,292, being in the rate of 1282·8 per 1,000 of the strength; the deaths, including those of invalids on the passage or after arrival at home were 144, being in the rate of 13·90 per 1,000; the average number of men in hospital daily throughout the year was 509, being in the rate of 49·12 per 1,000 men. Compared with the preceding year there is a reduction of 89·0 per 1,000 men in the admission rate, of 8·05 in the death rate, and of 7·34 in the constantly sick rate.

The admissions and deaths in each class and order of diseases, are shown in the following Table :—

| Order. | Diseases.                              | Strength, 10,362. |           |              |        | Ratio per 1,000 of Mean Strength. |       |           |       |
|--------|----------------------------------------|-------------------|-----------|--------------|--------|-----------------------------------|-------|-----------|-------|
|        |                                        | Admissions.       | Deaths.   |              |        | 1876.                             |       | 1869-75.  |       |
|        |                                        |                   | In India. | Of Invalids. | Total. | Admitted.                         | Died. | Admitted. | Died. |
|        | <b>I. General Diseases.</b>            |                   |           |              |        |                                   |       |           |       |
| 1      | Febrile Group ..                       | 5,181             | 23        | 1            | 24     | 500·0                             | 2·32  | 636·8     | 5·09  |
| 2      | Constitutional „ ..                    | 1,334             | 12        | 6            | 18     | 128·7                             | 1·74  | 144·9     | 2·16  |
|        | <b>II. Local Diseases.</b>             |                   |           |              |        |                                   |       |           |       |
|        | Diseases of the—                       |                   |           |              |        |                                   |       |           |       |
| 1      | Nervous System ..                      | 152               | 10        | ..           | 10     | 14·7                              | ·96   | 17·0      | 2·40  |
| 2      | Eye .. ..                              | 234               | ..        | ..           | ..     | 22·6                              | ..    | 26·2      | ..    |
| 3      | Ear .. ..                              | 78                | ..        | ..           | ..     | 7·5                               | ..    | 6·3       | ·01   |
| 4      | Nose .. ..                             | 9                 | ..        | ..           | ..     | ·9                                | ..    | ·6        | ..    |
| 5      | Circulatory System ..                  | 167               | 11        | ..           | 11     | 16·1                              | 1·06  | 13·7      | 1·16  |
| 6      | Absorbent „ ..                         | 225               | ..        | ..           | ..     | 21·7                              | ..    | 22·9      | ..    |
| 8      | Respiratory „ ..                       | 364               | 10        | 1            | 11     | 35·1                              | 1·06  | 42·9      | ·71   |
| 9      | Digestive „ ..                         | 2,222             | 38        | 7            | 45     | 214·4                             | 4·34  | 221·1     | 3·81  |
| 10     | Urinary „ ..                           | 959               | ..        | ..           | ..     | 92·5                              | ..    | 81·1      | ·23   |
| 11     | Generative „ ..                        | 86                | ..        | ..           | ..     | 8·3                               | ..    | 10·7      | ·01   |
| 12     | Organs of Locomotion..                 | 52                | ..        | ..           | ..     | 5·0                               | ..    | 4·5       | ·05   |
| 13     | Cellular Tissue.. ..                   | 125               | ..        | 1            | 1      | 12·1                              | ·10   | 17·9      | ..    |
| 14     | Cutaneous System ..                    | 669               | ..        | ..           | ..     | 64·6                              | ..    | 71·3      | ·01   |
|        | <b>III. Conditions, &amp;c.</b>        |                   |           |              |        |                                   |       |           |       |
|        | Debility.. ..                          | 325               | ..        | ..           | ..     | 31·4                              | ..    | 20·0      | ·03   |
|        | <b>IV. Poisons</b>                     | 92                | 3         | ..           | 3      | 8·9                               | ·29   | 8·4       | ·30   |
|        | <b>V. Injuries.</b>                    |                   |           |              |        |                                   |       |           |       |
| 2      | Accidental .. ..                       | 999               | 15        | ..           | 15     | 96·4                              | 1·45  | 89·0      | ·73   |
| 3      | Homicidal .. ..                        | ..                | ..        | ..           | ..     | ..                                | ..    | ·1        | ·08   |
| 4      | Self-inflicted .. ..                   | 3                 | 6         | ..           | 6      | ·3                                | ·58   | ·2        | ·47   |
| 5      | Judicial.. ..                          | ..                | ..        | ..           | ..     | ..                                | ..    | ..        | ·07   |
|        | <b>VI. Surgical Operations.</b>        | 2                 | ..        | ..           | ..     | ·2                                | ..    | ·1        | ·01   |
|        | No appreciable disease                 | 14                | ..        | ..           | ..     | 1·4                               | ..    | ·7        | ..    |
|        | Total ..                               | 13,292            | 128       | 16           | 144    | 1282·8                            | 13·90 | 1439·4    | 17·33 |
|        | Average of 10 years, }<br>1866-75 .. } | ..                | ..        | ..           | ..     | 1381·5                            | 17·32 | ..        | ..    |

**GENERAL DISEASES.**—The rate of prevalence of diseases in this class is lower than in 1875 by 22·0 per 1,000 men; the whole of the decrease is in the *febrile* group. The rate of mortality for the class is 6·96 per 1,000 men lower than in the preceding year, and the reduction amounts to 6·19 per 1,000 in the *febrile*, and to ·77 per 1,000 in the *constitutional* group.

The admissions and deaths caused by the principal diseases of this class, are shown in the following Table:—

| Strength .. .. .                |       |    |       | 10,362    | Ratio per 1,000 of Mean Strength. |           |       |           |       |  |
|---------------------------------|-------|----|-------|-----------|-----------------------------------|-----------|-------|-----------|-------|--|
| General Diseases.               |       |    |       | Admitted. | Died.                             | 1876.     |       | 1869-75.  |       |  |
|                                 |       |    |       |           |                                   | Admitted. | Died. | Admitted. | Died. |  |
| <i>Febrile</i> —                |       |    |       |           |                                   |           |       |           |       |  |
| Eruptive Fevers .. .. .         | 16    | .. | 1·5   | ..        | 1·4                               | ·05       |       |           |       |  |
| Continued .. .. .               | 924   | 17 | 89·2  | 1·64      | 148·7                             | 1·81      |       |           |       |  |
| Paroxysmal .. .. .              | 4,216 | 3  | 406·9 | ·29       | 481·1                             | 1·16      |       |           |       |  |
| Cholera .. .. .                 | 5     | 2  | ·5    | ·19       | 3·0                               | 1·98      |       |           |       |  |
| Influenza .. .. .               | 1     | .. | ·1    | ..        | ·8                                | ..        |       |           |       |  |
| Erysipelas .. .. .              | 17    | 2  | 1·6   | ·19       | 1·3                               | ·04       |       |           |       |  |
| Other diseases of this group    | 2     | .. | ·2    | ..        | ·5                                | ·05       |       |           |       |  |
| Total .. .. .                   | 5,181 | 24 | 500·0 | 2·31      | 636·8                             | 5·09      |       |           |       |  |
| <i>Constitutional</i> —         |       |    |       |           |                                   |           |       |           |       |  |
| Rheumatism. .. .. .             | 339   | .. | 32·7  | ..        | 41·7                              | ·05       |       |           |       |  |
| Syphilis .. .. .                | 893   | 1  | 86·1  | ·10       | 84·9                              | ·12       |       |           |       |  |
| Scrofula, Phthisis, &c. .. .. . | 63    | 16 | 6·1   | 1·54      | 9·6                               | 1·71      |       |           |       |  |
| Scurvy and Purpura .. .. .      | 3     | .. | ·3    | ..        | ·6                                | ·07       |       |           |       |  |
| Anæmia .. .. .                  | 26    | .. | 2·5   | ..        | 7·1                               | ·05       |       |           |       |  |
| Other diseases of this group    | 10    | 1  | 1·0   | ·10       | 1·0                               | ·16       |       |           |       |  |
| Total .. .. .                   | 1,334 | 18 | 128·7 | 1·74      | 144·9                             | 2·16      |       |           |       |  |

*Eruptive Fevers.*—13 of the admissions for fevers of this nature were from small-pox, 1 was from chicken-pox, and 2 were from vaccination.

*Continued Fevers.*—For all fevers of this group together, there is a reduction of 14·3 per 1,000 men on the rate of prevalence in the preceding year, and a reduction of ·49 per 1,000 in the rate of deaths. *Enteric Fever.*—There were 51 admissions for this form of fever, being in the rate of 4·9 per 1,000 of the strength; the deaths were 17 in number, or 333·3 per 1,000 of the attacks of the disease, showing a decrease of 95·3 per 1,000 on the rate of deaths to attacks for the preceding year. The proportion of admissions for *simple continued fever*, and for *febricula* together, is a little lower than that of 1875; no deaths were due to either of these forms of fever.

*Paroxysmal Fevers.*—The rate of prevalence is nearly the same as that for the preceding year, the difference (3·1 per 1,000 men) being in favor of the present year; the rate of mortality (·29 per 1,000 men) is only one-third of the rate for 1875.

*Cholera.*—This disease, which was present in an epidemic form, and caused a relatively large loss in 1875, caused only 5 admissions and 2 deaths in the present year, they took place in the second, and in the third quarters of the year.

*Rheumatism.*—The rate of prevalence is 10·9 per 1,000 men lower than in 1875.

*Syphilis.*—There is a large increase, 15·2 per 1,000 men, in the rate of admissions on that of the preceding year.

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*Scrofula, Phthisis, &c.*—The rate of prevalence and also that of mortality is lower than in the preceding year, the first by 1·1, the last by ·39 per 1,000 men, facts which are of no particular significance, as in those diseases the results are so much influenced by the amount of invaliding.

*Anæmia.*—The rate of admissions is only two-thirds of that of the preceding year.

**LOCAL DISEASES.**—*Diseases of the Nervous System.*—The rate of admissions is 3·1 per 1,000 men lower than in 1875, and the rate of mortality is less than one-third; the last circumstance is due to the comparative infrequency of apoplexy, and of sunstroke, in the present year.

The rate of admissions is lower than in the preceding year for diseases of the eye, ear, circulatory, absorbent, respiratory, digestive, and generative systems, for diseases of the cellular tissue, and of the cutaneous systems; the most considerable reduction is in that of diseases of the digestive system, for which it amounts to 28·5 per 1,000 men; for diseases of the urinary system, and of the organs of locomotion, the rates of prevalence are slightly higher. The rates of mortality are fractionally higher than those of the preceding year for diseases of the circulatory, respiratory, and digestive systems.

**CONDITIONS, &c.**—*Debility.*—The rate of admissions is fractionally higher than in 1875.

**POISONS.**—The rate of admissions is nearly the same as that for the preceding year; the rate of deaths is fractionally lower, 41 of the admissions were for delirium tremens, 48 for alcohol poisoning, 1 for poisoning by sulphate of zinc, 1 admission was for a snake bite, and 1 for sting by a scorpion.

**INJURIES.**—*Accidental.*—The admissions in this order are in a lower rate than in 1875, by 7·4 per 1000 men, but the rate of mortality is ·48 per 1,000 men higher. One of the deaths was from lightning, 5 were from drowning, 2 from fractures, 6 from gunshot, and 1 was due to the impaction of a foreign body in the larynx. The 6 self-inflicted deaths, were by gunshot in each instance.

The admissions and deaths at the principal stations in the Command, are shown in the following Table:—

| Military Divisions. | Stations.     | Average Annual Strength. | Admitted into Hospital. | Died in India. | Ratio per 1,000 of Strength. |       |                               |       |
|---------------------|---------------|--------------------------|-------------------------|----------------|------------------------------|-------|-------------------------------|-------|
|                     |               |                          |                         |                | Admitted.                    | Died. | Average of 10 Years, 1866-75. |       |
|                     |               |                          |                         |                |                              |       | Admitted.                     | Died. |
| Presidency          | Bombay .. ..  | 506                      | 1,043                   | 4              | 2061·3                       | 7·91  | 1474·1                        | 16·29 |
|                     | Deolali .. .. | 114                      | 125                     | 1              | 1097·1                       | 8·77  | ..                            | ..    |
|                     | Baroda .. ..  | 211                      | 313                     | 3              | 1483·4                       | 14·22 | ..                            | ..    |
|                     | Ahmedabad ..  | 262                      | 427                     | 4              | 1626·0                       | 15·27 | 2040·0                        | 23·76 |
|                     | Mount Abco .. | 66                       | 73                      | ..             | 1106·1                       | ..    | 1839·6                        | 17·16 |
|                     | Deesa .. ..   | 689                      | 667                     | 8              | 968·1                        | 11·61 | 1318·0                        | 17·35 |
|                     | Aden .. ..    | 721                      | 562                     | 11             | 779·5                        | 15·26 | 1040·3                        | 14·30 |
|                     | Kurrachi ..   | 677                      | 773                     | 6              | 1141·8                       | 8·86  | 1534·3                        | 13·31 |
|                     | Hyderabad ..  | 360                      | 792                     | 5              | 2200·0                       | 13·90 | 1327·0                        | 17·06 |



| Military Divisions. | Stations.                    | Average Annual Strength. | Admitted into Hospital. | Died in India. | Ratio per 1,000 of Strength. |       |                               |       |
|---------------------|------------------------------|--------------------------|-------------------------|----------------|------------------------------|-------|-------------------------------|-------|
|                     |                              |                          |                         |                | Admitted.                    | Died. | Average of 10 Years, 1866-75. |       |
|                     |                              |                          |                         |                |                              |       | Admitted.                     | Died. |
| Poona ..            | Poona .. ..                  | 1,508                    | 2,087                   | 21             | 1384·0                       | 13·93 | 1394·5                        | 12·57 |
|                     | Kirkee .. ..                 | 430                      | 555                     | 8              | 1293·0                       | 18·60 | 1318·5                        | 11·56 |
|                     | Ahmednagar ..                | 466                      | 683                     | 3              | 1465·7                       | 6·44  | 1148·4                        | 9·03  |
|                     | Satara .. ..                 | 154                      | 117                     | ..             | 760·0                        | ..    | 1122·7                        | 12·28 |
|                     | Belgaum .. ..                | 989                      | 835                     | 7              | 844·3                        | 7·08  | 1008·0                        | 8·35  |
| Mhow ..             | Mhow .. ..                   | 1,151                    | 1,575                   | 5              | 1368·4                       | 4·34  | 1578·9                        | 12·98 |
|                     | Indore .. ..                 | 86                       | 163                     | ..             | 1895·4                       | ..    | 1377·4                        | 12·90 |
|                     | Neemuch .. ..                | 403                      | 730                     | 10             | 1811·4                       | 24·81 | 1986·3                        | 28·84 |
|                     | Nasirabad .. ..              | 640                      | 955                     | 13             | 1492·2                       | 20·31 | 1781·6                        | 31·41 |
|                     | Assirgarh .. ..              | 43                       | 56                      | ..             | 1302·2                       | ..    | 1280·4                        | 11·41 |
|                     | Depôts, Sanitaria, &c...     | 196                      | 319                     | 9              | 1627·5                       | 45·92 | 2389·6                        | 59·10 |
|                     | Troops on the March, &c. ... | 373                      | 253                     | 2              | 678·3                        | 5·36  | 904·6                         | 12·30 |

The rate of admissions is lower than that of the preceding year for each of the stations given in the Table except Deolali, Deesa, Hyderabad, Ahmednagar, Indore, and Assirgarh; in the instance of Deesa, and of Indore, the excess is not considerable, in that of Hyderabad, it amounts to 923, and in that of Ahmednagar to 511 per 1,000 men. The exceptionally great prevalence of ague at Hyderabad in the last quarter of the year, accounts for the high rate of admissions there; the Medical Officer of the hospital states, that the outbreak of ague coincided in point of time with the drying up of the inundated lands adjoining the river, following recession into the usual channel, and that the Native population, as well as the European, suffered greatly from ague. The excess in the rate of sickness for Ahmedabad, was also due to ague, but the Medical Officer of the detachment of the 1st Battalion 2nd Regiment stationed here notes that the men acquired ague at Colaba, and arrived at Ahmednagar in an extremely weakened state, and that their health was greatly improved by residence at the last-named place.

The admissions and deaths, in the various classes and orders of diseases, in each division of the Command, are shown in the following Table:—

Bombay.

| Military Divisions ...       | Presi-<br>dency. | Poona.    |       | Mhow.     | Troops<br>on March. |           | Conva-<br>sents and<br>Invalids. |                  | Presidency. |                  | Poona. | Mhow.            | Troops on<br>March. |                  | Convalescents<br>and Invalids. |           |
|------------------------------|------------------|-----------|-------|-----------|---------------------|-----------|----------------------------------|------------------|-------------|------------------|--------|------------------|---------------------|------------------|--------------------------------|-----------|
| Average Annual Strength ...  | 3,635            | 3,324     |       | 2,327     | 373                 |           | 196                              | Ratio per 1,000. |             | Ratio per 1,000. |        | Ratio per 1,000. |                     | Ratio per 1,000. |                                |           |
| Diseases.                    |                  | Admitted. | Died. | Admitted. | Died.               | Admitted. | Died.                            | Admitted.        | Died.       | Admitted.        | Died.  | Admitted.        | Died.               | Admitted.        | Died.                          | Admitted. |
| I. General Diseases.         |                  |           |       |           |                     |           |                                  |                  |             |                  |        |                  |                     |                  |                                |           |
| 1. Febrile Group ...         | 2,144            | 7         | 1,608 | 5         | 1,275               | 10        | 589-8                            | 1-92             | 483-8       | 1-50             | 547-9  | 4-30             | 126-0               | 260-2            | ...                            | ...       |
| 2. Constitutional " ...      | 329              | 3         | 520   | 3         | 357                 | 2         | 90-5                             | 83               | 156-4       | 790              | 153-4  | 86               | 126-0               | 347-0            | 13-31                          | ...       |
| II. Local Diseases.          |                  |           |       |           |                     |           |                                  |                  |             |                  |        |                  |                     |                  |                                |           |
| Diseases of the--            |                  |           |       |           |                     |           |                                  |                  |             |                  |        |                  |                     |                  |                                |           |
| 1. Nervous System ...        | 68               | 6         | 37    | 1         | 50                  | 1         | 16-0                             | 1-65             | 11-1        | 30               | 21-5   | 43               | 2-7                 | 30-4             | ...                            | ...       |
| 2. Eye ...                   | 88               | ...       | 63    | ...       | 75                  | ...       | 24-5                             | ...              | 18-9        | ...              | 32-2   | ...              | 13-4                | 35-7             | ...                            | ...       |
| 3. Ear ...                   | 37               | ...       | 25    | ...       | 13                  | ...       | 10-2                             | ...              | 7-5         | ...              | 5-6    | ...              | ...                 | ...              | ...                            | ...       |
| 4. Nose ...                  | 2                | ...       | 4     | ...       | 4                   | ...       | 5                                | ...              | 1-2         | ...              | 1-7    | ...              | ...                 | ...              | ...                            | ...       |
| 5. Circulatory System ...    | 70               | 4         | 41    | 4         | 45                  | 3         | 19-2                             | 1-10             | 12-3        | 1-21             | 19-3   | 1-29             | 5-4                 | 35-7             | 5-10                           | ...       |
| 6. Absorbent " ...           | 74               | ...       | 72    | ...       | 40                  | ...       | 20-4                             | ...              | 21-7        | ...              | 17-2   | ...              | 37-5                | 137-8            | ...                            | ...       |
| 7. Respiratory " ...         | 110              | 4         | 121   | 4         | 99                  | ...       | 30-3                             | 1-10             | 36-4        | 1-20             | 42-6   | ...              | 48-3                | 66-3             | 5-10                           | ...       |
| 8. Digestive " ...           | 672              | 11        | 701   | 15        | 702                 | 7         | 184-8                            | 3-02             | 210-9       | 4-52             | 301-7  | 3-01             | 120-6               | 237-8            | 20-41                          | ...       |
| 9. Urinary " ...             | 310              | ...       | 304   | ...       | 242                 | ...       | 85-3                             | ...              | 91-5        | ...              | 104-0  | ...              | 67-0                | 71-4             | ...                            | ...       |
| 10. Genitive " ...           | 27               | ...       | 29    | ...       | 15                  | ...       | 7-4                              | ...              | 11-7        | ...              | 6-4    | ...              | 8-0                 | 15-3             | ...                            | ...       |
| 11. Organs of Locomotion ... | 13               | ...       | 21    | ...       | 7                   | ...       | 3-6                              | ...              | 6-3         | ...              | 3-0    | ...              | 2-7                 | 15-3             | ...                            | ...       |
| 12. Cellular Tissue ...      | 36               | ...       | 53    | ...       | 37                  | ...       | 9-9                              | ...              | 16-0        | ...              | 15-9   | ...              | 2-7                 | 66-3             | ...                            | ...       |
| 13. Cutaneous system ...     | 220              | ...       | 162   | ...       | 182                 | ...       | 88-0                             | ...              | 48-7        | ...              | 69-6   | ...              | 32-2                | ...              | ...                            | ...       |
| III. Conditions, &c.         |                  |           |       |           |                     |           |                                  |                  |             |                  |        |                  |                     |                  |                                |           |
| Debility ...                 | 182              | ...       | 68    | ...       | 106                 | ...       | 36-3                             | ...              | 20-5        | ...              | 45-6   | ...              | 18-8                | 102-0            | ...                            | ...       |
| IV. Poisons ...              | 29               | 3         | 50    | ...       | 18                  | ...       | 8-0                              | 83               | 15-0        | ...              | 7-7    | ...              | ...                 | 5-1              | ...                            | ...       |
| V. Injuries.                 |                  |           |       |           |                     |           |                                  |                  |             |                  |        |                  |                     |                  |                                |           |
| 2. Accidental ...            | 335              | 2         | 314   | 3         | 279                 | 9         | 92-1                             | 35               | 94-5        | 90               | 120-0  | 3-87             | 67-0                | 56-1             | ...                            | ...       |
| 4. Self-inflicted ...        | 2                | 3         | ...   | 2         | ...                 | ...       | 5                                | 83               | ...         | 60               | ...    | ...              | ...                 | 5-1              | ...                            | ...       |
| VI. Surgical Operations      |                  |           |       |           |                     |           |                                  |                  |             |                  |        |                  |                     |                  |                                |           |
| No appreciable disease ...   | 1                | ...       | ...   | ...       | 1                   | ...       | 2                                | ...              | ...         | ...              | 4      | ...              | ...                 | ...              | ...                            | ...       |
| Total                        | 4,793            | 43        | 4,208 | 37        | 3,530               | 32        | 1318-6                           | 11-83            | 1265-9      | 11-13            | 1516-9 | 13-76            | 678-3               | 1627-5           | 45-92                          | ...       |

GENERAL DISEASES.—Compared with the preceding year there is an increase of 70·1 per 1,000 men in the rate of the Presidency Division, the whole of it occurs in the *febrile group*; with increased prevalence of diseases of this class however the death-rate is 4·58 per 1,000 men, or considerably more than half, lower. For each of the other Divisions, the rate of prevalence of general diseases is lower, whilst (as a consequence of the comparative absence of cholera) the rate of mortality is much lower.

The admissions and deaths from the principal diseases in the *febrile group*, are shown in the following Table :—

| Military Divisions...               | Presidency. |       | Poona.    |       | Mhow.     |       | Troops on March. |       | Convalescent Depôts and Invalids. |       | Ratio per 1,000. |       | Presidency. |       | Poona.    |       | Mhow.     |       | Troops on March. |       | Convalescent Depôts and Invalids. |       |
|-------------------------------------|-------------|-------|-----------|-------|-----------|-------|------------------|-------|-----------------------------------|-------|------------------|-------|-------------|-------|-----------|-------|-----------|-------|------------------|-------|-----------------------------------|-------|
|                                     | Admitted.   | Died. | Admitted. | Died. | Admitted. | Died. | Admitted.        | Died. | Admitted.                         | Died. | Admitted.        | Died. | Admitted.   | Died. | Admitted. | Died. | Admitted. | Died. | Admitted.        | Died. | Admitted.                         | Died. |
| Strength ... ..                     | 8,635       | 3,324 | 2,327     | 373   | 196       |       |                  |       |                                   |       |                  |       |             |       |           |       |           |       |                  |       |                                   |       |
| General Diseases.                   |             |       |           |       |           |       |                  |       |                                   |       |                  |       |             |       |           |       |           |       |                  |       |                                   |       |
| <i>Febrile—</i>                     |             |       |           |       |           |       |                  |       |                                   |       |                  |       |             |       |           |       |           |       |                  |       |                                   |       |
| Eruptive Fevers ... ..              | 5           | ...   | 8         | ...   | 1         | ...   | ...              | ...   | ...                               | ...   | ...              | ...   | 1·4         | ...   | 2·4       | ...   | ...       | ...   | ...              | ...   | ...                               | ...   |
| Continued " ... ..                  | 387         | 3     | 113       | 4     | 358       | 9     | ...              | ...   | ...                               | ...   | ...              | ...   | 106·5       | ·83   | 34·0      | 1·20  | 153·9     | 3·87  | 8·0              | ...   | 40·8                              | ...   |
| Paroxysmal " ... ..                 | 1,746       | 1     | 1,472     | 1     | 915       | 1     | 42               | ...   | 43                                | ...   | ...              | ...   | 480·3       | ·27   | 442·9     | ·30   | 333·2     | ·43   | 112·6            | ...   | 219·4                             | ...   |
| Cholera ... ..                      | 4           | 2     | 1         | ...   | ...       | ...   | ...              | ...   | ...                               | ...   | ...              | ...   | 1·1         | ·55   | ·3        | ...   | ...       | ...   | ...              | ...   | ...                               | ...   |
| Influenza ... ..                    | ...         | ...   | ...       | ...   | 1         | ...   | ...              | ...   | ...                               | ...   | ...              | ...   | ...         | ...   | ...       | ...   | ...       | ...   | ...              | ...   | ...                               | ...   |
| Erysipelas ... ..                   | 2           | 1     | 12        | ...   | ...       | ...   | 2                | ...   | ...                               | ...   | ...              | ...   | ·6          | ·27   | 3·6       | ...   | ...       | ...   | 5·4              | ...   | ...                               | ...   |
| Other diseases of this group ... .. | ...         | ...   | 2         | ...   | ...       | ...   | ...              | ...   | ...                               | ...   | ...              | ...   | ...         | ...   | ...       | ...   | ...       | ...   | ...              | ...   | ...                               | ...   |
| Total ... ..                        | 2,144       | 7     | 1,608     | 6     | 1,275     | 10    | 47               | ...   | 51                                | ...   | ...              | ...   | 539·9       | 1·92  | 483·8     | 1·60  | 547·9     | 4·30  | 126·0            | ...   | 260·2                             | ...   |
| <i>Constitutional—</i>              |             |       |           |       |           |       |                  |       |                                   |       |                  |       |             |       |           |       |           |       |                  |       |                                   |       |
| Rheumatism ... ..                   | 122         | ...   | 87        | ...   | 97        | ...   | 12               | ...   | 17                                | ...   | ...              | ...   | 33·6        | ...   | 26·3      | ...   | ...       | ...   | 32·2             | ...   | 86·7                              | ...   |
| Syphilis ... ..                     | 178         | ...   | 401       | ...   | 225       | 1     | 35               | ...   | 40                                | ...   | ...              | ...   | 48·9        | ...   | 120·6     | ...   | 97·2      | ·43   | 93·8             | ...   | 204·0                             | ...   |
| Serofula, Phthia, &c. ...           | 21          | 3     | 20        | 3     | 18        | 1     | ...              | ...   | 9                                 | 2     | ...              | ...   | 5·8         | ·83   | 6·0       | ·90   | 7·7       | ·43   | ...              | ...   | 45·9                              | 10·20 |
| Scurvy and Purpura ...              | ...         | ...   | ...       | ...   | 2         | ...   | ...              | ...   | ...                               | ...   | ...              | ...   | ...         | ...   | ...       | ...   | ·9        | ...   | ...              | ...   | ...                               | ...   |
| Anæmia ... ..                       | 4           | ...   | 10        | ...   | 11        | ...   | ...              | ...   | 1                                 | ...   | ...              | ...   | 1·1         | ...   | 3·0       | ...   | 4·7       | ...   | ...              | ...   | 5·1                               | ...   |
| Other diseases of this group ... .. | 4           | ...   | 2         | ...   | 3         | ...   | ...              | ...   | 1                                 | 1     | ...              | ...   | 1·1         | ...   | ·6        | ...   | 1·2       | ...   | ...              | ...   | 5·1                               | 5·10  |
| Total ... ..                        | 329         | 3     | 520       | 3     | 357       | 2     | 47               | ...   | 68                                | 3     | ...              | ...   | 90·5        | ·83   | 156·4     | ·90   | 153·4     | ·86   | 126·0            | ...   | 346·8                             | 15·30 |

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*Eruptive Fevers.*—The rate of admissions for fevers of this nature is nearly double that of the preceding year; the increase is mainly due to the presence of small-pox in two of the Divisions, in the first and second quarters of the year.

*Continued Fevers.*—Compared with the preceding year, the rate of admissions is higher for the Presidency Division by 14.5 per 1,000 men, and for the Mhow by 67.6; on the other hand the ratio for Poona is less by 109.6 per 1,000 men. The rate of mortality of continued fevers, is lower for the Presidency and Poona, but is 3.45 per 1,000 men, or more than nine times higher for the Mhow Division.

*Enteric Fever.*—The relation of enteric fever to locality and to season is shown in the following Table, which has been compiled from the Quarterly Returns of the Command :—

| Divisions.     | Stations.    | 1st Quarter. |       | 2nd Quarter. |       | 3rd Quarter. |       | 4th Quarter. |       | Total.    |       |
|----------------|--------------|--------------|-------|--------------|-------|--------------|-------|--------------|-------|-----------|-------|
|                |              | Admitted.    | Died. | Admitted.    | Died. | Admitted.    | Died. | Admitted.    | Died. | Admitted. | Died. |
| Presidency     | Bombay ..    | ..           | ..    | ..           | ..    | ..           | ..    | 1            | 1     | 1         | 1     |
|                | Baroda ..    | ..           | ..    | ..           | ..    | 1            | 1     | 1            | ..    | 3         | 1     |
|                | Ahmedabad .. | 1            | ..    | 1            | 1     | ..           | ..    | 1            | ..    | 3         | 1     |
|                | Hyderabad .. | ..           | ..    | ..           | ..    | 1            | ..    | ..           | ..    | 1         | ..    |
|                | Aden ..      | ..           | ..    | 2            | 1     | ..           | ..    | ..           | ..    | 2         | 1     |
| Poona ..       | Poona ..     | ..           | 2     | 1            | 4     | 1            | 2     | 1            | 2     | 10        | 4     |
| Mhow ..        | Mhow ..      | ..           | ..    | ..           | 5     | 1            | 2     | 1            | ..    | 7         | 2     |
|                | Neemuch ..   | ..           | ..    | ..           | ..    | 9            | 2     | 3            | 5     | 12        | 7     |
|                | Nasirabad .. | ..           | ..    | ..           | 2     | ..           | ..    | 1            | ..    | 3         | ..    |
|                | Assirgarh .. | ..           | ..    | ..           | ..    | ..           | ..    | 1            | ..    | 1         | ..    |
| Depôts, &c. .. | Tarraghar .. | ..           | ..    | ..           | ..    | 1            | ..    | ..           | ..    | 1         | ..    |
|                | Total ..     | 3            | 1     | 14           | 4     | 16           | 5     | 11           | 7     | 44        | 17    |

From the above it will be seen that the prevalence of enteric fever as in former years, had a wide area of diffusion, but not usually much intensity (as regards numbers affected) at any of the places at which it appeared. The exception to this was in the instance of Neemuch, where 12 attacks occurring in rapid sequence, among the men of the E Battery of the 4th Brigade Royal Artillery, constituted an outbreak of relative importance, and also one of some etiological interest. The Medical Officer reports concerning it that all the men attacked were received from two of the three blocks of buildings occupied, and that the probable cause of the outbreak was the insanitary state of the latrine, used exclusively by the men residing in the houses which furnished cases of the fever; he assumes that infection of this latrine must have taken place through the agency of an unrecognised first case, in which the disease was acquired from without; the men of the battery were in their second year of residence in India.

*Paroxysmal Fevers.*—The ratio of prevalence is higher than in 1875 for the Presidency, and for the Poona Division, but is lower for the Mhow by 140 per 1,000 men.

The following Table, taken from the report of the Principal Medical Officer, shows the proportional prevalence of paroxysmal fevers at the several stations

in the Command, arranged in the order of the greatest prevalence, in the *Bombay*. present and in the preceding year :—

| Stations.       | Rate of Admissions<br>per 1,000 of Strength. |        | Stations.       | Rate of Admissions<br>per 1,000 of Strength. |       |
|-----------------|----------------------------------------------|--------|-----------------|----------------------------------------------|-------|
|                 | 1876.                                        | 1875.  |                 | 1876.                                        | 1875. |
| Hyderabad ..    | 1356·5                                       | 622·3  | Indore.. ..     | 279·1                                        | 676·8 |
| Bombay.. ..     | 1085·8                                       | 1058·6 | Kirkee .. ..    | 278·6                                        | 319·6 |
| Aboo .. ..      | 750·0                                        | 424·5  | Purandhar ..    | 239·1                                        | 592·1 |
| Ahmedabad ..    | 709·9                                        | 590·6  | Belgaum .. ..   | 216·6                                        | 143·0 |
| Poona .. ..     | 614·1                                        | 720·0  | Teethul .. ..   | 20·0                                         | ..    |
| Neemuch .. ..   | 590·6                                        | 784·4  | Kurrachi .. ..  | 172·8                                        | 347·0 |
| Ahmednagar ..   | 455·3                                        | 90·9   | Deesa .. ..     | 171·0                                        | 119·5 |
| Ghizri .. ..    | 407·4                                        | 176·5  | Satara .. ..    | 163·4                                        | 276·7 |
| Mhow .. ..      | 361·7                                        | 486·5  | Taraghur .. ..  | 136·4                                        | 500·0 |
| Nasirabad .. .. | 358·1                                        | 393·4  | Aden .. ..      | 135·0                                        | 276·7 |
| Deolali .. ..   | 356·6                                        | 115·9  | Assirgarh .. .. | 116·3                                        | 271·7 |
| Baroda .. ..    | 303·3                                        | 134·8  | Khandala .. ..  | 105·3                                        | ..    |

*Cholera*.—The attacks of this disease occurred at the following stations :—Kurrachi (1), Deesa (1), Ahmedabad (2), Poona (1).

*Rheumatism*.—Each of the Divisions shows a reduction in the rate of prevalence on that of the preceding year, that for Mhow (28·3 per 1,000 men) being the greatest.

*Syphilis*.—The Presidency Division shows a reduction in the rate of prevalence of 9·7 per 1,000 men, whilst each of the other Divisions shows an increase, that for Poona being 34·71, that for Mhow 8·3 per 1,000 men.

*Scrofula, Phthisis, &c.*—The Presidency and the Poona Divisions, each show a small decrease on the rate of prevalence of the preceding year, the Mhow, a small increase, whilst the rate for Depôts, is the same in both years.

*LOCAL DISEASES.—Diseases of the Nervous System.*—Compared with the preceding year, the Presidency Division shows slightly higher rates of prevalence, and the Poona and the Mhow lower rates; the rate of mortality is much lower for each Division.

*Diseases of the Eye.*—The rates of prevalence are lower than those for 1875, in the Presidency, and in the Poona Divisions, that for the Mhow, is higher by 3·7 per 1,000 men.

*Diseases of the Circulatory System.*—The rates of admissions in the various Divisions differ only unimportantly from those of the preceding year; in the present year the rate of the Poona Division, is much lower than that of either of the others, but in a comparison the small number of observations deprives this result of any particular value.

*Diseases of the Respiratory System.*—Compared with the preceding year there is a reduction in the rate of admissions for each of the Divisions, and also for Depôts; as in 1875 the rate for the Mhow Division exceeds that of either of the others.

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*Diseases of the Digestive System.*—The rate of admissions of the Presidency Division is 48·6 per 1,000 men, and that of the Poona is 58· lower than in the preceding year; on the other hand the rate of the Mhow Division is 27· and that of Depôts is 20·4 per 1,000 men higher. In the Poona Division, with a lower admission, there is a higher death rate; in the Presidency, both rates are lower; in the Mhow, a higher admission and lower death-rate coexist: the death-rate of Depôts is double that of 1875.

*Diseases of the Urinary System.*—The rate of admission is in the Poona Division lower by 22·6 per 1,000 men than in the preceding year, that for each of the other Divisions is higher, for Mhow, the increase amounts to 25·2 per 1,000 men.

*Poisons.*—Compared with 1875 there is an increase on the rate of admissions in the Presidency and in the Poona Divisions, a decrease in the Mhow.

*INJURIES.—Accidental.*—Each of the Divisions shows a moderate reduction in the rate of admissions on that of 1875.

The admissions, deaths, invaliding, and the number of constantly sick, in the several Corps which served in the Command during the year, are shown in the following Table :—

Bombay.

| Regiments.                               | Average Annual Strength. | Admitted into Hospital. | Died. | Invalided. | Average Number constantly Sick. | Ratio per 1,000 of Annual Strength. |       |            |                  | Average Sick time to each Soldier. |       | Average duration of each Case of Sickness. | Stations during the Year.              |
|------------------------------------------|--------------------------|-------------------------|-------|------------|---------------------------------|-------------------------------------|-------|------------|------------------|------------------------------------|-------|--------------------------------------------|----------------------------------------|
|                                          |                          |                         |       |            |                                 | Admitted.                           | Died. | Invalided. | Constantly Sick. | Days.                              | Days. |                                            |                                        |
| <b>CAVALRY.</b>                          |                          |                         |       |            |                                 |                                     |       |            |                  |                                    |       |                                            |                                        |
| 3rd Hussars .. ..                        | 444                      | 633                     | 6     | 37         | 33.56                           | 1425.7                              | 13.51 | 83.33      | 75.59            | 27.81                              | 19.35 |                                            | Mhow; a detachment at Indore           |
| <b>ROYAL ARTILLERY.</b>                  |                          |                         |       |            |                                 |                                     |       |            |                  |                                    |       |                                            |                                        |
| D Battery, C Brig., Roy. Horse Artillery | 145                      | 244                     | 12    | 22         | 10.45                           | 1682.8                              | 82.76 | 151.72     | 72.07            | 26.31                              | 15.63 |                                            | Kirkee.                                |
| E " " "                                  | 138                      | 190                     | 1     | 20         | 8.47                            | 1376.8                              | 7.24  | 144.93     | 61.40            | 22.40                              | 16.22 |                                            | Mhow.                                  |
| A Batt., 4th Brig., R.A.                 | 166                      | 226                     | 2     | 4          | 9.66                            | 1361.4                              | 12.05 | 24.09      | 57.83            | 21.24                              | 15.60 |                                            | Kirkee.                                |
| B " " "                                  | 159                      | 270                     | 1     | 13         | 9.65                            | 1695.6                              | 6.29  | 81.76      | 60.69            | 22.15                              | 13.04 |                                            | Deesa; deta. at Aboe and at Ahmedabad. |
| C " " "                                  | 159                      | 206                     | 2     | 4          | 10.76                           | 1295.6                              | 12.58 | 23.16      | 67.67            | 24.66                              | 19.06 |                                            | Belgaum.                               |
| D " " "                                  | 162                      | 476                     | 5     | 5          | 10.24                           | 2938.3                              | 30.86 | 30.86      | 63.21            | 23.07                              | 7.85  |                                            | Kurrachi and Hyderabad.                |
| E " " "                                  | 159                      | 349                     | 8     | 8          | 12.41                           | 2195.0                              | 50.32 | 50.32      | 78.05            | 28.49                              | 12.87 |                                            | Neemuch, and on the March.             |
| F " " "                                  | 170                      | 267                     | 2     | 10         | 11.67                           | 1670.6                              | 11.77 | 58.82      | 68.25            | 24.91                              | 15.95 |                                            | Ahmedabad, and on the March.           |
| G " " "                                  | 150                      | 339                     | 9     | 12         | 13.53                           | 2260.0                              | 60.00 | 80.09      | 90.20            | 32.92                              | 14.27 |                                            | Nasirabad.                             |
| 1st " 6th " "                            | 91                       | 132                     | ..    | 4          | 5.53                            | 1450.6                              | ..    | 43.96      | 60.77            | 22.18                              | 15.29 |                                            | Colaba.                                |
| 2nd " " " "                              | 79                       | 68                      | 1     | ..         | 3.10                            | 860.8                               | 12.66 | ..         | 39.24            | 14.32                              | 16.64 |                                            | Aden.                                  |
| 3rd " " " "                              | 85                       | 89                      | 2     | 4          | 4.07                            | 1047.1                              | 23.53 | 47.07      | 47.88            | 17.08                              | 16.70 |                                            | Aden.                                  |
| 4th " " " "                              | 81                       | 111                     | 1     | 10         | 5.07                            | 1370.4                              | 12.35 | 123.16     | 62.60            | 22.83                              | 16.67 |                                            | Mhow; detachment at Colaba.            |
| 5th " " " "                              | 77                       | 108                     | 3     | 4          | 4.08                            | 1402.6                              | 38.96 | 51.95      | 52.99            | 19.34                              | 13.79 |                                            | Colaba, and at Aden.                   |
| 6th " " " "                              | 79                       | 185                     | ..    | 4          | 6.87                            | 2341.8                              | ..    | 50.63      | 86.96            | 31.34                              | 13.55 |                                            | Colaba.                                |
| B " 9th " " "                            | 171                      | 245                     | 1     | 9          | 8.04                            | 1432.8                              | 5.85  | 52.63      | 47.02            | 17.16                              | 11.98 |                                            | Kurrachi.                              |
| E " " " "                                | 165                      | 239                     | 2     | 3          | 8.46                            | 1448.5                              | 12.12 | 18.18      | 51.27            | 18.70                              | 12.92 |                                            | Kirkee, and at Baroda.                 |
| F " " " "                                | 162                      | 255                     | 2     | 11         | 7.35                            | 1574.0                              | 12.35 | 67.90      | 45.37            | 16.56                              | 10.52 |                                            | Neemuch, and at Ahmednagar.            |
| Total Royal Artillery                    | 2,398                    | 3,999                   | 54    | 147        | 149.41                          | 1667.6                              | 21.27 | 61.30      | 62.31            | 22.74                              | 13.67 |                                            |                                        |

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| Regiments.             | Average Annual Strength. | Admitted into Hospital. | Died. | Invalided. | Average Number constantly Sick. | Rate per 1,000 of Annual Strength. |       |            |                  | Average Sick time to each Soldier. | Average duration of each Case of Sickness. | Stations during the Year.                                                           |
|------------------------|--------------------------|-------------------------|-------|------------|---------------------------------|------------------------------------|-------|------------|------------------|------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------|
|                        |                          |                         |       |            |                                 | Admitted.                          | Died. | Invalided. | Constantly Sick. |                                    |                                            |                                                                                     |
| ROYAL ENGINEERS ..     | 40                       | 2                       | ..    | ..         | 15                              | ..                                 | ..    | ..         | ..               | ..                                 | ..                                         | Kirkee.                                                                             |
| INFANTRY.              |                          |                         |       |            |                                 |                                    |       |            |                  |                                    |                                            |                                                                                     |
| 1st Batt., 2nd Foot .. | 885                      | 1,297                   | 11    | 29         | 51.44                           | 1465.5                             | 12.43 | 32.77      | 58.12            | 21.22                              | 14.55                                      | Ahmednagar, and at Poona; detachments at Colaba and at Satara.                      |
| 2nd " 7th " ..         | 881                      | 785                     | 10    | 53         | 38.60                           | 891.0                              | 11.35 | 60.16      | 43.81            | 15.77                              | 17.95                                      | Poona, and Belgaum.                                                                 |
| 2nd " 15th " ..        | 896                      | 995                     | 13    | 29         | 36.51                           | 1110.5                             | 14.52 | 32.37      | 40.75            | 14.87                              | 13.40                                      | Poona, and Deesa; detachments at Ahmedabad and at Baroda.                           |
| 2nd " 17th " ..        | 102                      | 101                     | 1     | ..         | 2.57                            | 990.2                              | 9.80  | ..         | 25.20            | 9.29                               | 9.28                                       | Arrived from England on 7th November; Mhow, with detachment at Assingharh.          |
| 2nd " 25th " ..        | 119                      | 31                      | 2     | ..         | 1.79                            | 260.6                              | 16.81 | ..         | 15.04            | 5.41                               | 21.07                                      | Aden; left for England on 2nd March.                                                |
| 55th Foot ..           | 524                      | 378                     | 7     | 18         | 18.65                           | 721.4                              | 13.36 | 34.35      | 35.60            | 12.99                              | 18.01                                      | Arrived in the Bombay Command from Bengal on February 15; Aden.                     |
| 56th " ..              | 782                      | 949                     | 9     | 46         | 36.18                           | 1213.6                             | 11.50 | 53.82      | 46.27            | 16.89                              | 13.92                                      | Kurruchi; detachment at Hyderabad.                                                  |
| 66th " ..              | 851                      | 1,272                   | 12    | 25         | 35.80                           | 1404.7                             | 14.10 | 29.38      | 42.07            | 15.35                              | 10.28                                      | Belgaum, Poona, and Ahmednagar; detachments at Bombay and Satara.                   |
| 68th " ..              | 865                      | 1,168                   | 5     | 44         | 45.66                           | 1350.3                             | 5.78  | 50.87      | 52.79            | 19.27                              | 14.27                                      | Nasirabad; detachment at Neemuch and at Tarragarh.                                  |
| 83rd " ..              | 894                      | 871                     | 11    | 43         | 35.72                           | 974.3                              | 12.30 | 48.11      | 39.96            | 14.58                              | 14.97                                      | Deesa; detachments at Abcoo, Ahmedabad, and Baroda.                                 |
| 108th " ..             | 681                      | 811                     | 8     | 11         | 23.71                           | 1190.9                             | 4.41  | 16.15      | 33.35            | 12.17                              | 10.22                                      | Nasirabad and Mhow; detachments at Indore and Assingharh. Left for England Dec. 20. |
| Total Infantry ..      | 7,480                    | 8,653                   | 84    | 298        | 325.63                          | 1157.5                             | 11.23 | 30.84      | 43.51            | 15.49                              | 13.73                                      |                                                                                     |



The relation between length of residence in the Command (or in India) *Bombay.* and the results as to health of the different corps, are shown in the following Table :—

| Regiments, &c.          | Year of Service in the Command (or in India). | Average Annual Strength. | Admitted into Hospital. | Died. | Invalided. | Average Number of constantly Sick. | Rate per 1,000 of Annual Strength. |       |            |                  | Average Sick time to each Soldier. | Average Duration of each Case of Sickness. |
|-------------------------|-----------------------------------------------|--------------------------|-------------------------|-------|------------|------------------------------------|------------------------------------|-------|------------|------------------|------------------------------------|--------------------------------------------|
|                         |                                               |                          |                         |       |            |                                    | Admitted.                          | Died. | Invalided. | Constantly Sick. |                                    |                                            |
| 2nd Batt., 17th Foot    | 1st                                           | 102                      | 101                     | 1     | ..         | 2·57                               | 990·2                              | 9·80  | ..         | 25·20            | Days. 9·29                         | Days. 9·28                                 |
| 4th Brigade, R.A. ...   | } 2nd                                         | 2,021                    | 9,128                   | 42    | 85         | 114·43                             | 1547·8                             | 20·78 | 42·06      | 56·62            | 20·67                              | 13·35                                      |
| 2nd Batt., 16th Foot    |                                               |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 2nd Batt., 7th Foot.    | 3rd                                           | 881                      | 785                     | 10    | 53         | 38·60                              | 891·0                              | 11·36 | 60·16      | 43·81            | 15·99                              | 17·94                                      |
| C Brigade, R.I.L.A. ... | 4th                                           | 283                      | 431                     | 13    | 42         | 18·92                              | 1533·6                             | 45·94 | 148·41     | 66·85            | 24·40                              | 15·91                                      |
| 68th Foot .. ..         | 5th                                           | 865                      | 1,169                   | 5     | 44         | 45·66                              | 1350·3                             | 5·78  | 50·87      | 52·79            | 19·27                              | 14·27                                      |
| 56th Foot .. ..         | 6th                                           | 782                      | 949                     | 9     | 46         | 36·18                              | 1213·5                             | 11·50 | 58·82      | 46·27            | 16·83                              | 13·92                                      |
| 66th Foot .. ..         | } 7th                                         | 1,745                    | 2,143                   | 23    | 68         | 71·52                              | 1228·1                             | 13·18 | 38·96      | 40·99            | 14·96                              | 12·19                                      |
| 83rd " .. ..            |                                               |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 3rd Hussars             | } 8th                                         | 1,434                    | 2,065                   | 18    | 86         | 86·13                              | 1440·0                             | 12·55 | 59·97      | 60·08            | 21·92                              | 15·27                                      |
| 6th Brigade, R.A. ...   |                                               |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 9th " .. ..             |                                               |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |
| 2nd Batt., 25th Foot    | 9th                                           | 119                      | 31                      | 2     | ..         | 1·79                               | 260·6                              | 16·81 | ..         | 15·04            | 5·41                               | 21·07                                      |
| 1st Batt., 2nd Foot.    | 10th                                          | 885                      | 1,297                   | 11    | 29         | 51·44                              | 1465·5                             | 12·43 | 32·77      | 56·12            | 21·22                              | 14·56                                      |
| 55th Foot .. ..         | } Over 10 years                               | 1,205                    | 1,189                   | 10    | 29         | 41·36                              | 986·7                              | 8·26  | 24·07      | 34·32            | 12·53                              | 12·70                                      |
| 108th " .. ..           |                                               |                          |                         |       |            |                                    |                                    |       |            |                  |                                    |                                            |

Bombay.

*Officers.*

The average annual strength of the Officers serving in the Command was 364, the attacks of sickness among them were 252, the deaths in India, were 5, the number invalided was 54; the proportions given by these numbers are for attacks of sickness 692, for deaths 13.71, and for invaliding 148.36 per 1,000 of the strength respectively.

The deaths were caused, by enteric fever (2), remittent fever (1), hepatitis (2).

*Women.*

The average annual strength of the wives of the non-commissioned officers and soldiers was 1125; the admissions were 904, the deaths (in India) were 17. The proportions given by these numbers are, for admissions 803.6, and for deaths 15.11 per 1,000 of the strength respectively; both are more favourable than the rates of the preceding year. The greatest number of admissions is that for diseases of the *febrile group*, 216 being for ague; diseases of the *digestive system*, are in the proportion of 167 per 1,000 of the strength (that for non-commissioned officers and men being 214.4 per 1,000). The cases of abortion were 10, and (not included in the admissions stated above) there were 289 admissions for childbirth. The deaths (which occurred in India) were due to smallpox (1), remittent fever (1), cholera (1), apoplexy (2), diseases of the heart (2), pneumonia (2), dysentery or diarrhoea (5), debility (1); two deaths were consequent on the puerperal state.

*Children.*

In an average annual strength of 2,389 children of non-commissioned officers and men, there were 1,359 admissions into hospital, and 102 deaths in India (exclusive of 5 deaths of premature children), being in the annual rates of 568.9, and of 42.70 per 1,000 of the strength respectively; the death-rate is 52.77 per 1,000 lower than that for 1875; this reduction is partly due to the comparative absence of cholera in the present year, but, mainly, to the much less fatal character of illnesses of diseases of the digestive system. The admissions for *eruptive fevers* were 20 in number, for *enteric fever* 5, for *paroxysmal fevers* 284, for *cholera* 1. As in the preceding year there was no admission for *phthisis*, but for *mesenteric tabes*, there were 11 admissions. *Diseases of the nervous system* gave only 18 (or adding those returned in another order under the head of *teething*), there were 118 admissions. *Diseases of the eye*, caused 190 admissions, of which all but 1 were from *conjunctivitis*; the rate of admissions for diseases of this order, 79 per 1,000, is more than three-fold higher than that for the men. *Diseases of the digestive system* (exclusive of *teething*), caused 248 admissions, being in the rate of 103.8 per 1,000 of the strength. For *general debility* there were 128 admissions. The deaths were due to enteric fever (1), simple continued fever (4), paroxysmal fevers (5), hereditary syphilis (1), tabes (3), anæmia (1), hydrocephalus (1), convulsions (14), laryngitis (1), bronchitis (6), pneumonia (4), atelectasis (1), teething (22), enteritis (1), dysentery (6), diarrhoea (18), ulceration of bowel (1), jaundice (1), debility (6), burn (3), drowning (1), suffocation (1).

## SANITARY REPORT.

Surgeon-General Stewart reports:—

*Barracks.*—At Colaba, the old dépôt barracks referred to last year have been abandoned, and the occupants removed to one of the new barracks vacated by Artillery.

At Baroda, the barracks are old, and defective in general construction.

At Poona, some of the old Ghorpoorie barracks are to be replaced by new ones.

At Nasirabad, of the three barracks occupied by the Royal Artillery, the old barrack is reported to have given a larger proportion of admissions from fever than either of the other two. This is attributed to defective construction.

At Deokali, during the trooping season, the barrack accommodation has to *Bombay*. be supplemented by tents.

At Ahmedabad, new barracks have been constructed.

At Deesa, the barracks are old and faulty as regards general construction.

*Cells*.—At Deesa, the cells are reported of insufficient cubic space, and are enclosed by a wall seven feet high which obstructs the breeze.

At Aden, the site of the garrison cells is reported too crowded by other buildings, especially by the Native General Hospital with its outhouses.

*Guard Rooms, Aden*.—At the main pass, a new guard-room was completed at the beginning of the year. At the Isthmus, the guard-room affords too little accommodation, the floor space per man being stated as 25·71 square feet, and the air space as 379 cubic feet only. The men have therefore to sleep in the verandahs. At Steamer Point, too, the amount of space per man in the guard-room has been reported as greatly deficient during the year, though less so than at the Isthmus.

At Baroda, also, the guard-rooms are represented as too small.

*Drainage*.—At Ahmednagar, the drainage pipes connected with Royal Artillery barracks are reported to be defective, requiring to be trapped where they communicate with the barracks, and to have their distant outlets moved further from the buildings.

At Aden, surface drainage at the Isthmus is said to be required.

*Ventilation*.—This has on the whole been satisfactory. At Nasirabad, in the single-storeyed Artillery barrack referred to above, the ventilation of the leeward room is reported defective, receiving the exhalations from the windward room.

*Warming*.—Artificial warming is not required at most of the stations in this Presidency.

At Aboo, wood fires are allowed during December, January, and February.

*Lighting*.—Complaints as to the lighting of the barracks are very general, the kerosine lamps referred to in last year's report not having been as yet supplied.

*Flooring*.—At some stations there are still objectionable earthen floors, as in the married quarters at Kirkee, Ahmednagar, and Kurrachi.

*Abution and Bath Accommodation*.—On the whole this has been satisfactory. In the Infantry barracks at Ahmednagar the want of privacy in the arrangement for bathing is remarked upon by the Acting Deputy Surgeon-General.

*Latrines*.—The dry-earth system of conservancy is everywhere in use except at a few stations where dry earth is not available in sufficient quantity, and disinfectant powder has to be used. Difficulty is experienced in getting the men always to place earth in the pans before leaving the latrines.

*Urinals*.—The urinals are generally iron receptacles placed in detached erections of a temporary nature, freely ventilated.

*Water Supply*.—The water supply has generally been good and abundant. Macnamara's filters have not yet been furnished to the troops, but their purchase has been sanctioned.

At Nasirabad, the supply continues to be from the Dilwara well, and the quality of this single source has been suspicious during the year.

*Dieting*.—The rations on the whole have been very good. Beef is issued on five and mutton on two days each week, one pound per man, an amount which several medical officers think should be increased.

*Cooking*.—The usual Indian plan is generally adopted; at some stations Dean's apparatus is also in use, the cooks, however, do not like them, assigning as their reason that the fuel is insufficient.

*Clothing*.—The clothing is well suited to the climate.

*Duties*.—The usual routine of duties has not been prejudicial to the health of the troops. At stations where gymnasia exist, gymnastic exercises have been favourably reported upon.

*Hospitals*.—The position of the station hospital at Colaba is bad, being on low ground, and to leeward of, and shut in by, the Artillery barracks.

At Ahmedabad, one of the new Artillery barracks is being fitted up as an hospital.

At Wanowrie, the site and plan of the hospital are reported defective.

*Bombay.*

During the year several minor improvements about this hospital have been carried out.

At Deolali, during the trooping season, the hospital accommodation is inadequate, and has to be supplemented by tents.

At Neemuch, the Artillery hospital has been vacated, and the sick received into the Infantry hospital.

At Mhow, a new female hospital for the cavalry has been built.

*Veneral.*—1. Under Bombay Act, No. 3 of 1867, sect. 1, lock hospitals exist at the following stations: Deolali, Ahmedabad, Dessa, Aden, Kurrachi, Poona, Kirkee, Ahmednagar, Belgaum, Mhow, Neemuch, Nasirabad.

2. In the ablution rooms at several stations a special closet, with a special supply of water, is set apart for private ablution.

3. There was nothing specially noteworthy regarding the prevalence of the disease during the year.

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## Section II.

India.

*On the Extent of Invaliding.*

2,286 non-commissioned officers and men were invalided from India, being in the proportion of 38.98 per 1,000 of the strength, which is 7.26 per 1,000 men lower than the rate of the preceding year. For the Bengal Command the rate is lower by 4.63; for the Madras by 9.85, and for the Bombay by 14.2 per 1,000.

The classes and orders of diseases for which the men were invalided from the three Commands, are shown in the following Table:—

| Orders. | Station .. ..                       | Invalids sent home from— |         |         | Invalids from India discharged the Service. |
|---------|-------------------------------------|--------------------------|---------|---------|---------------------------------------------|
|         |                                     | Bengal.                  | Madras. | Bombay. |                                             |
|         |                                     | 37,147                   | 11,132  | 10,362  | 58,641                                      |
|         | <b>I. General Diseases.</b>         |                          |         |         |                                             |
| 1       | Febrile Group .. ..                 | 82                       | 10      | 48      | ..                                          |
| 2       | Constitutional „ .. ..              | 260                      | 93      | 85      | 314                                         |
|         | <b>II. Local Diseases.</b>          |                          |         |         |                                             |
|         | Diseases of the—                    |                          |         |         |                                             |
| 1       | Nervous System .. ..                | 87                       | 43      | 22      | 43                                          |
| 2       | Eye .. ..                           | 16                       | ..      | 10      | 35                                          |
| 3       | Ear .. ..                           | 12                       | 2       | 8       | 25                                          |
| 4       | Nose .. ..                          | ..                       | 1       | ..      | ..                                          |
| 5       | Circulatory System .. ..            | 173                      | 34      | 31      | 275                                         |
| 6       | Absorbent „ .. ..                   | ..                       | 3       | ..      | 1                                           |
| 8       | Respiratory „ .. ..                 | 55                       | 11      | 12      | 43                                          |
| 9       | Digestive „ .. ..                   | 328                      | 156     | 102     | 153                                         |
| 10      | Urinary „ .. ..                     | 11                       | 4       | 7       | 17                                          |
| 11      | Generative „ .. ..                  | 6                        | 2       | 3       | 5                                           |
| 12      | Organs of Locomotion .. ..          | 9                        | 3       | 5       | 26                                          |
| 13      | Cellular Tissue .. ..               | 3                        | 2       | 1       | 2                                           |
| 14      | Cutaneous System .. ..              | 8                        | 5       | 6       | 12                                          |
|         | <b>III. Debility</b> .. ..          | 218                      | 102     | 132     | 207                                         |
|         | <b>V. Injuries.</b>                 |                          |         |         |                                             |
| 2       | Accidental .. ..                    | 22                       | 7       | 9       | 32                                          |
|         | <b>VI. Surgical Operations.</b>     | 3                        | ..      | 1       | 7                                           |
|         | <b>Total</b> .. ..                  | 1,326                    | 478     | 482     | 1,292                                       |
|         | <b>Ratio per 1,000 of { 1876 ..</b> | 35.69                    | 42.94   | 46.52   | 20.50                                       |
|         | <b>Strength .. { 1866-75</b>        | 44.03                    | 49.85   | 37.99   | 16.20                                       |

In the Bengal Command, diseases of the *febrile group*, give a materially higher rate of invaliding than in the preceding year; diseases of the digestive system are also in a higher rate. For diseases of the *circulatory system*, there is a decrease consequent on the smaller number of men sent home for palpitation. The most material reduction is for *debility*, which mainly determines the reduced rate for the Command.

The decrease in the rate of invaliding of the Madras Command on that of 1875 is contributed to in a small extent by the smaller number of men sent home for diseases of the *circulatory system*, but is mainly the result of the

India.

comparative infrequency of invaliding for diseases of the *digestive system*. A considerably larger number of men were invalided for *debility*.

For the Bombay Command the decrease in the rate of invaliding on that of the preceding year, is contributed to by nearly every group of diseases.

## Section III.

*Mean Daily Sick.*

The average number of non-commissioned officers and men always ineffective from sickness in Bengal was 2,060, in Madras 561, and in Bombay 509.

The usual information, calculated from these numbers, is given in the subjoined Table:—

|                                                        | Bengal. |          | Madras. |          | Bombay. |          |
|--------------------------------------------------------|---------|----------|---------|----------|---------|----------|
|                                                        | 1876.   | 1866-75. | 1876.   | 1866-75. | 1876.   | 1866-75. |
| Ratio per 1,000 constantly Sick ..                     | 55·46   | 56·13    | 50·40   | 60·02    | 49·12   | 54·43    |
| Average sick Time to each Soldier..                    | 20·24   | 20·59    | 18·39   | 21·91    | 17·94   | 19·87    |
| Average Duration of each Case of }<br>Sickness .. .. . | 14·33   | 14·05    | 16·75   | 17·04    | 13·91   | 14·39    |

## Section IV.

*On the influence of Age on Mortality.*

The ages of the Troops serving in India, arranged in quinquennial periods, and the deaths at each age, are shown in the following Table:—

|                                                    | Under 20.         |       | 20 and under 25.  |       | 25 and under 30.  |       | 30 and under 35.  |       | 35 and under 40.  |       | 40 and upwards.   |       |
|----------------------------------------------------|-------------------|-------|-------------------|-------|-------------------|-------|-------------------|-------|-------------------|-------|-------------------|-------|
|                                                    | Average Strength. | Died. | Average Strength. | Died. | Average Strength. | Died. | Average Strength. | Died. | Average Strength. | Died. | Average Strength. | Died. |
| Bengal ... ..                                      | 704               | 5     | 11,335            | 141   | 12,100            | 184   | 5,897             | 119   | 4,348             | 96    | 1,227             | 62    |
| Madras ... ..                                      | 855               | 4     | 3,410             | 38    | 3,223             | 53    | 2,013             | 35    | 1,716             | 31    | 411               | 20    |
| Bombay ... ..                                      | 145               | 3     | 2,931             | 35    | 3,505             | 40    | 1,784             | 18    | 1,438             | 29    | 341               | 15    |
| Total ... ..                                       | 1,204             | 12    | 17,676            | 214   | 18,828            | 277   | 9,694             | 172   | 8,002             | 156   | 1,979             | 97    |
| Ratio of deaths per 1,000 of Strength, 1876 ... .. | 9·98              |       | 12·11             |       | 14·71             |       | 17·74             |       | 19·50             |       | 49·01             |       |
| Ditto, 1866-75 ...                                 | 8·28              |       | 16·08             |       | 19·65             |       | 23·31             |       | 36·61             |       | 56·69             |       |

## XIV.—ON THE HEALTH OF THE TROOPS ON BOARD SHIP.

## STATISTICAL REPORT.

The troops embarked on board ship during the year, as shown by the returns received in the Army Medical Department, were:—

*Troops on Board Ship.*

|                                                                             |        |
|-----------------------------------------------------------------------------|--------|
| I. Corps, and Drafts for Corps, proceeding on service abroad .. .. .        | 11,505 |
| II. Corps returning from abroad .. .. .                                     | 8,518  |
| III. Do. or Detachments, passing by sea from one Command to another .. .. . | 4,378  |
| IV. Invalids returning to England .. .. .                                   | 2,361  |

## I. TROOPS PROCEEDING ON FOREIGN SERVICE.

11,505 non-commissioned officers and men, giving an annual average strength of 994, embarked for service abroad during the year; amongst them there were 381 admissions into hospital, and 1 death, being in the ratios of 383·3 and of 1·01 per 1,000 of the strength respectively.

The classes and orders of diseases by which the admissions and the deaths were caused are shown in the following Table:—

| Order. | Stations.                         | To all Stations Abroad. |       |                  |       |
|--------|-----------------------------------|-------------------------|-------|------------------|-------|
|        | No. of N.-C. O. and men Embarked. | 11,505                  |       |                  |       |
|        | Average Annual Strength .. ..     | 994                     |       |                  |       |
|        | Diseases.                         | Admitted.               | Died. | Ratio per 1,000. |       |
|        |                                   |                         |       | Admit-<br>ted.   | Died. |
|        | I. General Diseases.              |                         |       |                  |       |
| 1      | Febrile Group .. .. .             | 29                      | ..    | 29·2             | ..    |
| 2      | Constitutional „ .. .. .          | 95                      | ..    | 95·6             | ..    |
|        | II. Local Diseases.               |                         |       |                  |       |
| 1      | Nervous System .. .. .            | 5                       | ..    | 5·0              | ..    |
| 2      | Eye .. .. .                       | 11                      | ..    | 11·1             | ..    |
| 6      | Absorbent System .. .. .          | 11                      | ..    | 11·1             | ..    |
| 8      | Respiratory „ .. .. .             | 20                      | ..    | 20·1             | ..    |
| 9      | Digestive „ .. .. .               | 68                      | ..    | 68·4             | ..    |
| 10     | Urinary „ .. .. .                 | 34                      | ..    | 34·2             | ..    |
| 11     | Generative „ .. .. .              | 2                       | ..    | 2·0              | ..    |
| 12     | Organs of Locomotion .. .. .      | 2                       | ..    | 2·0              | ..    |
| 13     | Cellular Tissue .. .. .           | 13                      | ..    | 13·1             | ..    |
| 14     | Cutaneous System .. .. .          | 49                      | ..    | 49·3             | ..    |
|        | III. Conditions, &c.              |                         |       |                  |       |
|        | Debility .. .. .                  | 4                       | ..    | 4·0              | ..    |
|        | V. Injuries.                      |                         |       |                  |       |
| 2      | Accidental .. .. .                | 38                      | 1     | 38·2             | 1·01  |
|        | Total .. .. .                     | 381                     | 1     | 383·3            | 1·01  |

**Troops on Board Ship.**

The rate of admissions is 50·7 per 1,000 lower than the corresponding one of the preceding year; that of deaths is nine-tenths lower.

7,747 of the troops embarked proceeded to India, and 3,758 to other Commands; the admission rates for the two bodies are 357·6 and 460·3 per 1,000 of the strengths respectively.

**GENERAL DISEASES.**—*Diseases of the Febrile Group.*—The rate of prevalence of diseases in this group is nearly the same as that of the preceding year; one admission only was due to an eruptive fever. Enteric fever, caused one admission on the voyage of H.M.S. Malabar to Bombay.

*Diseases of the Constitutional Group,* are in a higher rate of prevalence than in 1875, owing mainly to an increase in the numbers of admissions for syphilis.

*Diseases of the Respiratory System.*—The rate of admissions is less than one-fourth of the corresponding rate of 1875; no death was due to any disease in this order.

**INJURIES.**—*Accidental.*—The death in this class was from a fracture of the skull.

**II. TROOPS RETURNING FROM ABROAD.**

The number of effective troops embarked for England, from stations abroad, was 8,518 non-commissioned officers and men, giving an annual average strength of 713. The admissions into hospital were 297, and the deaths 6, being in the ratios of 416·5 and of 8·41 per 1,000 respectively; the first is a little lower (50 per 1,000) than the corresponding rate of the preceding year, the death rate is 3·57 per 1,000 men higher.

The admissions and deaths in the various classes and orders of diseases are shown in the following Table:—

| Order.                      |                               |            | From all Stations Abroad. |                 |             |  |
|-----------------------------|-------------------------------|------------|---------------------------|-----------------|-------------|--|
|                             | No. of men Embarked .. ..     |            | 8,518                     |                 |             |  |
|                             | Average Annual Strength .. .. |            | 713                       |                 |             |  |
|                             | Diseases.                     | Admitted.  | Died.                     | Ratio per 1,000 |             |  |
| Admitted.                   |                               |            |                           | Died.           |             |  |
| <b>I. General Diseases.</b> |                               |            |                           |                 |             |  |
| 1                           | Febrile Group .. ..           | 97         | 1                         | 135·0           | 1·40        |  |
| 2                           | Constitutional " .. ..        | 27         | ..                        | 37·9            | ..          |  |
| <b>II. Local Diseases.</b>  |                               |            |                           |                 |             |  |
| Diseases of the —           |                               |            |                           |                 |             |  |
| 1                           | Nervous System .. ..          | 2          | ..                        | 2·8             | ..          |  |
| 2                           | Eye .. ..                     | 5          | ..                        | 7·0             | ..          |  |
| 6                           | Absorbent System .. ..        | 6          | ..                        | 8·4             | ..          |  |
| 8                           | Respiratory " .. ..           | 35         | 4                         | 49·1            | 5·61        |  |
| 9                           | Digestive " .. ..             | 49         | ..                        | 68·7            | ..          |  |
| 10                          | Urinary " .. ..               | 7          | ..                        | 9·8             | ..          |  |
| 11                          | Generative " .. ..            | 3          | ..                        | 4·2             | ..          |  |
| 13                          | Cellular Tissue .. ..         | 8          | ..                        | 11·2            | ..          |  |
| 14                          | Cutaneous System .. ..        | 20         | ..                        | 28·1            | ..          |  |
| <b>III. Conditions.</b>     |                               |            |                           |                 |             |  |
|                             | Debility .. ..                | 11         | ..                        | 15·4            | ..          |  |
| <b>IV. Poisons</b>          |                               |            |                           |                 |             |  |
|                             | .. ..                         | 3          | ..                        | 4·2             | ..          |  |
| <b>V. Injuries.</b>         |                               |            |                           |                 |             |  |
| 2                           | Accidental .. ..              | 24         | 1                         | 33·7            | 1·40        |  |
| <b>Total .. ..</b>          |                               | <b>297</b> | <b>6</b>                  | <b>416·5</b>    | <b>8·41</b> |  |



**GENERAL DISEASES.—Febrile Group.**—The rate of admissions is two-fold *Troops on* higher than that of the preceding year. *Paroxysmal fevers*, caused nearly the *Board Ship* whole of the admissions in this group; the death was due to remittent fever.

**Diseases of the Respiratory System.**—Most of the admissions in this order were on account of bronchitis, but the small number returned makes it probable that only the severest cases of the disease were included. Two of the deaths were caused by pneumonia, both being those of men returning from India; one death, attributed to pulmonary apoplexy, was that of a man returning from Mauritius.

**Diseases of the Digestive System.**—The rate of admissions is only fractionally different from that of the preceding year.

**INJURIES.—Accidental.**—The death in this order was by drowning.

### III. TROOPS PROCEEDING BY SEA FROM ONE STATION ABROAD TO ANOTHER.

4,378 non-commissioned officers and men (white troops) were embarked, giving an average annual strength of 176. The admissions into hospital were 62, being in the proportion of 352·3 per 1,000 of the annual strength; 1 death occurred, being in the proportion of 5·68 per 1,000 men.

The classes and orders of diseases, by which the admissions were caused, are shown in the following Table:—

| White Troops.              |                         |           |       |                  |       |
|----------------------------|-------------------------|-----------|-------|------------------|-------|
| Strength embarked .. ..    |                         |           |       |                  | 4,378 |
| Average Annual Strength .. |                         |           |       |                  | 176   |
| Order.                     | Diseases.               | Admitted. | Died. | Ratio per 1,000. |       |
|                            |                         |           |       | Admitted.        | Died. |
| I. General Diseases.       |                         |           |       |                  |       |
| 1                          | Febrile Group .. ..     | 19        | 1     | 107·9            | 5·68  |
| 2                          | Constitutional „ ..     | 6         | ..    | 34·0             | ..    |
| II. Local Diseases.        |                         |           |       |                  |       |
| Diseases of the—           |                         |           |       |                  |       |
| 1                          | Nervous System .. ..    | 1         | ..    | 5·7              | ..    |
| 2                          | Eye .. ..               | 2         | ..    | 11·4             | ..    |
| 6                          | Absorbent System .. ..  | 2         | ..    | 11·4             | ..    |
| 8                          | Respiratory „ .. ..     | 12        | ..    | 11·4             | ..    |
| 9                          | Digestive „ .. ..       | 3         | ..    | 51·1             | ..    |
| 10                         | Urinary „ .. ..         | 2         | ..    | 11·4             | ..    |
| 11                         | Generative „ .. ..      | 2         | ..    | 11·4             | ..    |
| 12                         | Organs of Locomotion .. | 1         | ..    | 5·7              | ..    |
| 13                         | Cellular Tissue .. ..   | 1         | ..    | 5·7              | ..    |
| 14                         | Cutaneous System .. ..  | 2         | ..    | 11·4             | ..    |
| III. Conditions.           |                         |           |       |                  |       |
|                            | Debility .. ..          | 1         | ..    | 5·7              | ..    |
| IV. Poisons .. ..          |                         |           |       |                  |       |
|                            |                         | 3         | ..    | 17·0             | ..    |
| V. Injuries.               |                         |           |       |                  |       |
| 2                          | Accidental .. ..        | 9         | ..    | 51·1             | ..    |
| General Total .. ..        |                         | 62        | 1     | 352·3            | 5·68  |

*Troops on  
Board Ship.*

**FEBRILE DISEASES.**—The death in this group was due to simple continued fever; in the course of the illness hæmorrhage from the bowels came on, and was the proximate cause of death.

#### IV. INVALIDS RETURNING TO ENGLAND.

The number of invalids embarked for England was 2,361, giving an annual average strength of 221 non-commissioned officers and men. There were 27 deaths amongst the invalids at sea; as in former years, they have been added to those of the troops in the various Commands from which the men were invalided.

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## APPENDIX.

### APPENDIX No. I.

#### REPORT ON THE PROGRESS OF HYGIENE FOR THE YEAR 1876 AND PART OF 1877.

By F. de CHAUMONT, M.D., Surgeon-Major, Professor of Military Hygiene,  
Army Medical School, Netley.

DURING 1876 and the present year there has been continued activity in hygienic matters, although nothing of any special kind can be cited as making the period exceptionally remarkable.

The points I may select for remark are the following :—

- I. Legislation.
- II. The Work of Societies, &c.
- III. Literature.
- IV. Special Points of Hygiene.

In this last division I shall take up a few points of interest, so far as time and space allow.

#### I. Legislation.

On this point there is but little to be said. With the exception of a few amendments on the Public Health Act of 1875, the attention of the Legislature has been but little directed towards the subject of State Hygiene, the only Act of importance being the Rivers Pollution Prevention Act, which had been delayed from the year before. This Act provides for the prevention of four sources of pollution, viz., 1, putting solid refuse into streams; 2, passing sewage into streams; 3, poisonous, noxious or polluting fluids from factories; and, 4, solid or liquid matter from mines which is poisonous, noxious or polluting or interferes with the flow of the water. Various saving clauses are inserted, such as certain restrictions on proceedings under the third and fourth heads, so as not to interfere unduly with industrial interests, and also reservations for channels already chiefly used as sewers, provided the best means of purifying the effluent waters be adopted. Under the Act both tidal waters and the sea may, under certain circumstances, be deemed *streams*, for the purposes of the Act. The Act extends, with modifications, to the United Kingdom generally. A good *résumé* of its provisions, with explanations, has been published by Mr. A. Glen.\*

A short Act of some importance was passed towards the end of the Session 1876-77, enabling proprietors, under certain circumstances, to charge their properties for the purpose of collecting and storing water for the supply of villages, &c.

Experience shows that several parts of the Public Health Act of 1875 require amendment, which will no doubt be carried out gradually. One point appears desirable, viz., an equalising of powers, and doing away with the distinction between urban and sanitary districts. As guides to the working and

\* "The Law as to the Pollution of Rivers." By A. Glen. London, Knight and Co.

understanding of the law relating to public health, I may note the works of W. C. and A. Glen,\* of Chambers,† of Saunders,‡ of Lumley,§ and others.

## II. *Work of Societies, &c.*

The Congress at Brussels (in connection with the Exhibition of Sanitary Appliances and Life-Saving Apparatus) which took place in the autumn of 1876, afforded a good instance of the great interest in hygienic matters that has been awakened of late years. The Congress opened on the 27th September, under the auspices of the King of the Belgians, and lasted for eight days, during which time a number of papers were read and many objects of interest discussed. It was attended by a large number of persons from all countries, either directly or indirectly connected with hygienic questions. Among the subjects discussed were ventilation and hospital construction, water supply, help to the sick and wounded in time of war, amelioration of the condition of the labouring classes, &c.

The exhibition itself was a very extensive one, including contributions from most European countries. Although there was nothing presenting any very special novelty, yet most of the improved sanitary appliances were represented. The section devoted to ambulances, &c., was very complete, and has been reported upon in detail by Professor Longmore. In the French and German sections there were very complete plans and models, showing the new works for the drainage and water supply of the chief great cities, such as Paris, Berlin, Leipsic, &c. In the city of Brussels itself the improvement produced by an amended system of drainage is well seen, the sewage being no longer discharged into the Senne, but carried through the city by a magnificently constructed sewer, which the members of the Congress had an opportunity of personally inspecting. The entire absence of offensive smell was notable, and the arrangements for dealing with the storm-waters seemed ingenious and effectual.

One thing in the exhibition, that struck me as curious, was a whole bay in the German section devoted to anti-vaccination literature and statistics.

There was a very complete series of models, plans, papers, &c., on the subject of cremation, principally from Germany and Italy.

In this country the Society of Arts continues, by means of its meetings, conferences, lectures and publications, to do much towards advancing sanitation.

A new association has been started under the title of "The Sanitary Institute of Great Britain," the first meeting of which was held in July in the theatre of the Royal Institution in Albemarle Street, under the presidency of the Duke of Northumberland. An eloquent inaugural address was given by Dr. B. W. Richardson, F.R.S. The object of the institute is to diffuse as widely as possible information on sanitary objects, to hold meetings and congresses in various parts of the country, to examine and grant certificates of competency to surveyors and inspectors of nuisances, and to further legislation and State influence for sanitary improvements. Its first provincial congress takes place at Leamington in October next. Two similar associations have likewise been founded in France, "La Société Française d'Hygiène" and "La Société de Médecine Publique et d'Hygiène Professionnelle."

At the meetings of other bodies, such as the British Medical Association, the Social Science Association, &c., the section of public health or State medicine forms a marked feature. At the meeting of the British Medical Association at Manchester this year (1877), there was an exhibition of sanitary appliances in connection with the Manchester and Salford Sanitary Association; this was filled with examples of the newest and most approved arrangements. At the forth-

\* "The Law of Public Health and Local Government," 8th edition. By W. Cunningham Glen and A. Glen. Knight and Co.

† "A Digest of the Law relating to Public Health and Local Government." By G. F. Chambers. Stevens and Sons.

‡ "The Public Health Act of 1875." By T. W. Saunders. "Law Times" Office.

§ "The Public Health Act of 1875," with copious Notes on. By W. G. and Edmund Lumley. London, Shaw and Sons.

coming meeting of the German association of medical men, naturalists, &c., in September, 1877, there will be a section devoted to general hygiene (*Gesundheitspflege*), and also one devoted to military medical and sanitary questions (*Militär-Sanitätswesen*).

### III. Literature.

Numerous works have appeared on sanitary subjects, among which I may notice the following:—

- "Handbook of Hygiene." By George Wilson. 3rd edition. (Churchill). This work has been enlarged and in great part rewritten; it gives an excellent *résumé* of the subject. In the preface the author pays a tribute to the memory of the late Professor Parkes, who first urged him to write the work, and revised the sheets of the first edition. This kindly assistance he would not allow him to acknowledge during his lifetime.
- "Militär-Gesundheitspflege." (Roth and Lex). This great work approaches completion, as the final volume will be published immediately. Although styled a "Handbuch," it is really encyclopædic in its mass of information.
- "Lehrbuch der Militär-Hygiene." Von Dr. C. Kirchner. II. Auflage. The first half of the new edition of this work has appeared; it seems to be considerably remodelled and extended. The former edition was a close imitation of the Manual of Professor Parkes.
- "Ueber Entwicklung und Gestaltung des Heeres-Sanitätswesen der Europäischen Staaten, von militärisch-geschichtlichen Standpunkte." Von Emil Knorr, Hauptmann. Hanover, 1877. Three parts of this work have appeared. It proposes to give a history of the rise and progress of the medical departments of armies in all countries, from the earliest period to the present time.
- Hirt. L. "System der Gesundheitspflege." Breslau.
- Lacassagne, A. "Précis d'Hygiène, privée et sociale." Paris (Masson).
- Pickler, W., and L. G. Kraus. "Compendium der Hygiène, Sanitätspolizei," &c.
- Kraus, Glieb and Pickler. "Encyclopädisch Wörterbuch der Staats-Arzneikunde." Stuttgart. Third part of a large work.
- Cesterlen. "Handbuch der Hygiene." Tübingen. 3rd edition.
- Kramer. "Handbuch der Staats-Arzneikunde." II. Theil. Halle.
- Bequerel. "Traité élémentaire d'Hygiène, privé et publique." Paris, (Asselin).
- Hermant. "Aide-Mémoire du Médecin-Militaire, recueil de notes sur l'Hygiène des Troupes," &c. Paris (Delahaye).

Besides the above, a large number of works and papers have been published bearing on the hygiene of particular countries and armies, which it would be impossible to enumerate here.

Two small works, which have a melancholy interest for us, must not be omitted, since they were the last contribution of the late Professor Parkes to the subject he had done so much to develop—

"Public Health." By the late E. A. Parkes, M.D., F.R.S., revised by Dr. Aitken. (Churchill).

"On the Personal Care of Health," (by the same Author), issued by the Society for Promoting Christian Knowledge.

The first gives a *résumé* of what is necessary to secure the health of a community, and the second is a short but clear and useful tract on the subject of personal health, addressed chiefly to working men. Both are written in the simple and effective style that so eminently characterised his writings.

Many works have been published in different countries of a popular kind, either addressed to the general public, or to particular ages or classes. In this country, Dr. Overend Drewry has published a monthly journal entitled "Health," which seems likely to be useful in diffusing knowledge of the subject. It is a marvel of cheapness, each number of sixteen pages costing only one penny.

It is of course impossible to give anything like a complete list of works and

papers, but the above are some of the more important; others will be referred to under their special heads.

I may, however, call attention to two publications of some interest, viz., 1st. The specimen fasciculus of the Catalogue of the Medical Library of the United States. Formerly this was a part of the library of Congress, but its growing importance and special character has led to its being separated and placed under the direction of the Surgeon-General. It is already one of the most complete in existence, and the plan of the catalogue is an admirable one. In one alphabetical list it gives both authors and subjects, distinguishing them by different types, and by means of cross references it also serves the purpose of a *catalogue raisonné*, thus saving much time and labour to the inquirer.

2nd. The other publication is a bibliographical record of works and papers published during the year 1875, on sanitary science in all its branches, printed in the "Deutsche Vierteljahrsschrift für öffentliche Gesundheitspflege," VIII. Band, IV. Heft, 1876. It appears to be a very complete *résumé*, and most valuable for reference. The German journals are very copious in their bibliographical lists, much more so than any of ours; and in this point, as in others, they are being followed by the Americans, as may be instanced by the bibliography of cholera at the end of the report on the cholera of 1873, compiled by Dr. J. Billings.

#### IV. *Special Points of Hygiene.*

1. *Water.*—On the subject of water a good deal of writing and controversy has taken place, as usual without much elucidation of the most important points. The most important publications have been Wanklyn's "Water Analysis," 4th edition, and a new edition (3rd) of Sutton's "Volumetric Analysis." The latter contains the best and most detailed account of the Frankland-Armstrong process for determining the organic nitrogen and carbon in water. As has been stated before, this process is quite out of the question for military or naval medical officers, and can only be carried on in well-appointed laboratories. At Netley we do not teach it, but adhere to the ammonia process of Wanklyn and Chapman. With regard to the latter, it must be understood that it is not held to be perfect, but that practically it is the best we have for the determination of nitrogenous matter. In the words of Hassall, "a good water will appear good, and a bad water is not likely to escape detection" ("Food and its Adulterations," 1876). Wanklyn ("Sanitary Record," 1877) gives an analysis of a deep well water at Richmond which contained 1.02 free ammonia, and 0.03 albuminoid ammonia. In spite of the large amount of free ammonia he puts this in his first class of waters, with the rider that it might prove dangerous by favouring vegetable growth if kept. In the new edition of Wanklyn's book, the only points regarding the ammonia process that are at all altered are, 1st, the practical discarding of the sodium carbonate solution in distilling for the free ammonia; Wanklyn says it is generally not necessary, especially in hard water; 2nd, a statement that with suitable apparatus the albuminoid ammonia can be determined upon 100 cc. of water, the Nesslerising being done to  $\frac{1}{1000}$  of a milligramme. For this purpose the apparatus requires to be small, and particularly the ammonia glasses, which are cylinders 10 centimeters (4 inches) high, and 1.5 centimeters ( $\frac{3}{8}$  of an inch) wide. In these glasses it is said that the difference between  $\frac{1}{1000}$  and  $\frac{1}{10000}$  of a milligramme of ammonia can be easily recognised. At Netley we always combine a determination of the oxidisable matter by permanganate with the ammonia processes, and by that means get information of more value than from either process alone. With respect to the mineral constituents, Mohr's new process for the determination of carbonates in drinking water is a very elegant one. It is founded on the fact that the presence of carbonate imparts a certain alkalinity to the water, which is readily detected by the use of cochineal. The introduction of this substance instead of litmus is a great advantage, it is much more sensitive, and gives much sharper indications; its natural colour is a carmine red, which is at once changed by acids to a yellow or reddish yellow. The change is sharp and sudden, with no return of colour, as is the case with litmus. The solution is prepared by bruising a little of the commercial cochineal in water which has been gently heated, adding a little alcohol and filtering. For the process a standard solution of sulphuric acid is

prepared by dissolving 4.9 grammes (by weight) of pure  $H_2SO_4$  and diluting to 1 litre; 2 ccs. of this are equal to 10 milligrammes of carbonate of lime. If 700 ccs. of water be operated upon, 2 ccs. of standard solution used will represent 1 grain of carbonate of lime per gallon. The process is simple: 700 ccs. of the water are taken, and a few drops of cochineal solution added (*N.B.* the colour should not be too deep), the solution of acid is dropped in until the carmine red is changed to yellow; read off the ccs. used and divide by 2, the result is grains of carbonate of lime per gallon. A simple plan would be to take 350 ccs. of the water, in which case the number of ccs. of acid solution used would exactly represent the grains per gallon of calcium carbonate. Thus 350 ccs. of a water took 13 ccs. of acid to effect the change of colour; result, 13 grains per gallon of calcium carbonate. If by other means we have already determined the calcium carbonate (as by the hardness), we can see if the two results correspond; usually Mohr's process gives more, in which case the difference is sodium carbonate. Wanklyn says that the result of this process generally corresponds with the amount of insoluble solids in the water: it is generally a little less on account of the presence of a little silica and alumina; should it be more, the difference is sodium carbonate as above mentioned. In that case the excess must be calculated out as sodium carbonate, 1 cc. = 1.06 (instead of 1 as in the case of calcium carbonate). *Example.*—350 ccs. of a water took 17 of acid solution: the calcium carbonate was already known to be 12; therefore the difference,  $17 - 12 = 5$ , is due to sodium carbonate;  $5 \times 1.06 = 5.3$  grains per gallon of sodium carbonate. Of course potassium carbonate might be present, but it is rare in drinking waters: its factor would be 1.38.

In estimating the solid residue of water, Wanklyn recommends the use of 70 ccs. only, dried over a beaker-glass of water; this, he says, evaporates in one hour. So small a quantity, however, requires a very delicate balance. He does not think a high temperature necessary, but contents himself with a heat so obtained, being something under the boiling point of water.

With regard to the search for poisonous metals, the qualitative test is really all that is necessary for hygienic purposes, and the plan suggested by Dr. W. A. Miller is a very good one. Lead and copper can be recognised in very small quantities by means of a solution of ammonium sulphide, which will produce a dark coloration of sulphide of the metal: if the water be then acidulated with hydrochloric acid without the dark colour disappearing, we may be certain that lead or copper is present. It is unnecessary to differentiate them, as they are both poisonous. Should the acid clear up the water, the sulphide has been iron only. This may be easily converted into a quantitative test by using standard solutions of the metals, and comparing the depth of tint produced. Water containing  $\frac{1}{10}$  of a grain per gallon of either lead or copper ought to be rejected, according to Wanklyn: I should be inclined to put the limit at  $\frac{1}{20}$ : of iron  $\frac{1}{4}$  grain should be the limit,  $\frac{1}{2}$  giving a distinct chalybeate taste. It is not quite certain how much copper would be poisonous, but it is well to be on the safe side. It is stated that the miners in the desert of Attacama (South America) prefer the water from the neighbourhood of the mines to that brought up in skins from the wells near the sea, on account of the disagreeable taste imparted to the latter, although the former contains enough of copper to give it a green colour. It is true that they use it chiefly for making coffee which may perhaps neutralise the effects.

On the influence of water upon lead, some investigations have been made by Mr. Pattison Muir, who finds that lead is easily dissolved by water containing nitrates—also chloride or sulphate of ammonium. Carbonates, sulphates and chlorides of other bases greatly diminish the solvent action of water on lead, but water charged with carbonic acid under pressure is a very active solvent. Hence, perhaps, the danger of aerated waters in contact with lead.

*Zinc* is a metal that must now be looked for, as there is no doubt that its presence does occur in water kept in so-called galvanised iron vessels. If potash or soda be added to water, and then sulphuretted hydrogen, a white precipitate is formed of zinc sulphide. The presence of iron, lead or copper, masks this, however; in case of their presence the water should be evaporated to dryness, the residue treated with solution of potash or soda, and then with sulphuretted hydrogen; a white precipitate indicates zinc.

The microscopic examination of water has not yet had sufficient attention paid to it, but it is beginning to be more resorted to. I may note a good paper on the subject by Dr. C. O. Harz, "Zeitschrift für Biologie," XII. Band, I. Heft. This method of inquiry (which seems to have been less used abroad even than in this country) is likely to lead to more useful results than chemical methods, or perhaps it would be more correct to say that chemical methods cannot be expected to produce results sufficient for hygienic purposes without the help of microscopic examination.

Among the War Office Circulars issued in 1876, was one (Clause 82) which dealt with the question of the chemical analysis of potable waters, directing that water should be analysed at stations when proper means were provided, and that, if the opinion of the Professor of Hygiene was desired, samples should be sent to Netley. The consequence of this order has been to throw a great amount of extra work upon our laboratory at Netley, for it has resulted in *all* the samples being sent there. This was certainly not contemplated when the circular was issued. The following Table gives the chief points of the analyses of 139 samples of water examined between June, 1876, and September, 1877. It has been drawn up from our laboratory records by Surgeon J. L. Notter, M.D. (Assistant Professor of Hygiene), by whom a large number of the analyses were made :—



98.

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| No. | Station.   | Source.                      | Qualitative Tests. |             |                 |                              |               |                 |                          |                                         | Chlorine.        | Remarks.           |
|-----|------------|------------------------------|--------------------|-------------|-----------------|------------------------------|---------------|-----------------|--------------------------|-----------------------------------------|------------------|--------------------|
|     |            |                              | Lime.              | Chlorine.   | Sulphuric Acid. | Nitric Acid.                 | Nitrous Acid. | Am-<br>monia.   | Phos-<br>phoric<br>Acid. | Organic<br>Matter by (Gold<br>Chloride. | Grs per<br>gall. |                    |
| 6   | Colchester | No. 1 Well, E<br>and F Lines | Marked             | Very marked | Marked          | In very<br>large<br>quantity | None ..       | Slight<br>trace | Present                  | No reaction                             | 4-330            | Suspicious.        |
| 7   | "          | No. 2 Well, ditto            | Marked             | Very marked | Marked          | In large<br>quantity         | Very<br>large | Slight<br>trace | Present                  | No reaction                             | 4-320            | Bad.               |
| 8   | "          | No. 3 Well, ditto            | Marked             | Very marked | Marked          | In large<br>quantity         | None ..       | Slight<br>trace | Present                  | Slight black-<br>ening                  | 3-820            | Very suspicious.   |
| 9   | "          | No. 4 Well, ditto            | Marked             | Very marked | Marked          | In large<br>quantity         | None ..       | Slight<br>trace | Present                  | Slight pink ..                          | 3-820            | Very suspicious.   |
| 10  | "          | No. 5 Well, ditto            | Marked             | Very marked | Marked          | In large<br>quantity         | None ..       | Slight<br>trace | Present                  | Slight black-<br>ening                  | 3-580            | Very suspicious.   |
| 11  | "          | No. 6 Well, ditto            | Marked             | Very marked | Marked          | In large<br>quantity         | Very<br>large | Slight<br>trace | Present                  | Shot pink ..                            | 3-420            | Bad.               |
| 12  | "          | No. 1 Well, D<br>Lines       | Marked             | Very marked | Very marked     | In large<br>quantity         | None ..       | None ..         | Present                  | Marked<br>blackening                    | 2-820            | Rather suspicious. |
| 13  | "          | No. 2 Well, ditto            | Marked             | Marked      | Very marked     | In large<br>quantity         | None ..       | None ..         | Present                  | Marked<br>blackening                    | 2-580            | Rather suspicious. |
| 14  | "          | No. 3 Well, ditto            | Marked             | Marked      | Very marked     | In large<br>quantity         | None ..       | None ..         | Present                  | Very marked<br>blackening               | 2-820            | Very suspicious.   |
| 15  | "          | No. 1 Well, C<br>Lines       | Marked             | Marked      | Very marked     | In large<br>quantity         | None ..       | None ..         | Present                  | blackening<br>Very slight               | 2-820            | Rather suspicious. |
| 16  | "          | No. 2 Well, ditto            | Marked             | Marked      | Very marked     | In large<br>quantity         | None ..       | None ..         | Present                  | Very slight                             | 2-820            | Rather suspicious. |
| 17  | "          | No. 3 Well, ditto            | Marked             | Marked      | Very marked     | In large<br>quantity         | None ..       | None ..         | Present                  | None ..                                 | 2-820            | Rather suspicious. |
| 18  | "          | No. 5 Well, A<br>and B Lines | Marked             | Marked      | Marked          | In large<br>quantity         | Slight..      | Very<br>marked  | Present                  | Very black..                            | 2-580            | Very bad.          |
| 19  | "          | No. 6 Well, ditto            | Marked             | Marked      | Marked          | In large<br>quantity         | None ..       | Slight..        | Present                  | None                                    | 2-330            | Rather suspicious. |

Of the above analyses 125 were quantitative and 14 qualitative only (except the chlorine). Where a constituent has been sought for and none found, the word *nil* is written ; where a blank is left, either the experiment has not been made or the result has not been recorded. The conclusions to be drawn are : 1st, That the generality of the waters is far from pure ; indeed, if we were to accept rigidly Professor Wanklyn's limitation, barely half-a-dozen out of the whole could be passed as potable waters. 2nd, That the physical and qualitative tests on the whole give a very considerable amount of information, in many cases sufficient for hygienic purposes.

The column of remarks contains the substance of the report made on each sample.

At the Hygienic Congress at Brussels last year, the question of the purity of water was a good deal discussed. M. Gérardin (Inspecteur des Etablissements Insalubres à Paris) gave a lecture on his method of determining the amount of dissolved oxygen in water, which he insisted upon as the only true measure of the purity of a drinking water. This consists in the use of hydrosulphite of sodium, in presence of the aniline colour known as "bleu Couper" ; so long as oxygen is present the blue colour is untouched, but when the oxygen is all absorbed by the reagent, the blue colour is discharged by the slightest excess. The solution of the reagent being titrated with copper sulphate, the amount of oxygen can be easily read off. The difficulty about the plan is that the reagent (the hydrosulphite) will not keep, but must be prepared fresh. M. Gérardin has, however, since seen reason to abandon his views to some extent, and to admit that water may exist with a good deal of oxygen and also a good deal of organic matter. He also insists upon the physical character of the *lustre* (*éclat*) of water, as indicating its degree of aëration.

*Filtration*.—On one point there seemed to be a pretty general feeling, and that was that the ordinary kinds of filtration were often very harmful, so much so that many chemists were inclined to discountenance filtration altogether. There is no doubt that under some circumstances filtration does harm, especially if a filter is kept for a length of time in use without cleansing or changing the filtering medium. The remarks on this point of the Commissioners in the "Sixth Report of the Rivers Pollutions Commission," bear upon the question when they note that in animal charcoal there are apt to be found myriads of minute worms, which pass out into the filtered water. In experiments at Netley I have seen facts that bore out this statement to some extent, viz., a tendency to the formation of low forms of life, chiefly vegetable, in water that had been passed through a charcoal filter. At the same time, this took place only after the water was kept for some time. On this point it may be remarked, that such a result could be partially obviated by great attention to cleansing, and by passing permanganate solution through the filtering medium. Also, that if the water is wanted for immediate use, the convenience and rapidity of charcoal filters, such as those of Major Crease, are very great. On the other hand, if the water is to be stored, especially in the tropics, there might be the danger referred to of the production of low forms of life. Such forms might not be hurtful of themselves, but we are yet in ignorance of how soon they might become so, therefore it is better to avoid them. Whether it is possible or not to prepare charcoal in such a way as to prevent such formations, has not yet been determined.

Mr. Gustav Bischof has investigated the question of filtration with reference to the use of spongy iron as a medium. In the "Proceedings of the Royal Society," No. 80, 1877, he has written a paper on "Putrescent Organic Matter in Potable Water," in which he shows that water, filtered through spongy iron, may be passed over meat (previously boiled to destroy organisms adhering to it) for weeks without inducing putrefaction, but that if the water be filtered through animal charcoal putrefaction is induced within a fortnight. If the meat is not previously boiled it putrefies in either case. On the above principles the spongy iron filter is formed, and it certainly has this advantage, that its component parts are entirely mineral throughout. The length of time during which the water is exposed to the filtering medium seems considerable, about twenty-two minutes, but Mr. Bischof thinks not only that this is necessary, but that in the case of impure waters it ought to be longer. Should this be the case, it would prove a drawback if a large quantity of water were required

at once. On the other hand, the filtered water might be stored in clean tanks or vessels, with but little danger of becoming impure if properly protected.

Numerous pamphlets and papers have been published bearing on the water supply of particular places, some of which contain interesting matter, but it would not serve any useful purpose to quote them here in detail. In the Indian Reports accounts of analyses of the waters of different stations are given, and I may notice particularly the Report of Dr. Lyon, Chemical Examiner to the Government of Bombay, which is very full on this point. Before leaving this subject, I may refer to an analysis I had an opportunity of making of the water of the Rakus Tal Lake, on the northern side of the Himalayan range. The sample was collected by Lieut.-Col. H. Knight, late 19th Regiment. It is considered to be a very pure water, although analysis did not prove it to be so. The quantity was very small, only 182 ccs., so that only a partial analysis could be made. It showed a good deal of flocculent matter in suspension, which, on microscopic examination, showed the following substances:—

Particles of sand.  
Black particles of an undetermined nature.  
Mycelium.  
Large cells, with a double wall and granular contents.  
Great quantities of minute colourless molecules, in a gelatinous matrix.  
Spores in considerable number.  
Large sporangia (like those of septaria).  
Cotton fibres, much attenuated.  
Linen ditto ditto.  
No animal life.

The linen and cotton fibres were accounted for by the fact of the vessel in which the water was collected having been wiped out before use. The qualitative chemical analysis showed both calcium and magnesium well marked; nitric acid, a doubtful trace; nitrous acid, present; iron, a trace. The hardness was not determined.

#### Quantitative Analysis.

| Quantitative Analysis.                   |   |                                                  |        | Grains per Gallon.        |
|------------------------------------------|---|--------------------------------------------------|--------|---------------------------|
| Volatile matter (by incineration) ....   |   |                                                  |        | 9.333                     |
| Including                                | { | Total oxygen required for oxidisable matter .... | 4.6510 | } Milligrammes per litre. |
|                                          |   | Oxygen for organic matter only ....              | 4.1670 |                           |
|                                          |   | Ammonia, free ....                               | 0.5600 |                           |
|                                          |   | "    albuminoid ....                             | 0.7000 |                           |
|                                          |   | Nitrous acid ....                                | 1.3915 |                           |
| Chlorine ....                            |   |                                                  |        | 3.827                     |
| Sodium (combined with chlorine) ....     |   |                                                  |        | 1.672                     |
| Salts of calcium and magnesium, &c. .... |   |                                                  |        | 31.251                    |
| Total solids by evaporation ....         |   |                                                  |        | 46.083                    |

This water we should have been obliged to condemn as impure. Another sample, got from a neighbouring lake, Lake Manarasowar, was unfortunately lost in transit from the bottle being broken. Water from large deep lakes is usually purer than this; it would be interesting to know the cause of this impurity, which must be partly of animal origin, although chiefly vegetable.

At home, the success of the Loch Katrine supply to Glasgow has turned attention to lakes as a possible source of supply for other cities; in particular the proposed use of the water of Thirlmere for Manchester has excited much interest and not a little controversy. Mr. Wanklyn suggests that all mountain-waters ought to be examined very carefully for metallic contamination, especially when metalliferous strata abound, and he thinks London may have had a most fortunate escape in the collapse of the great scheme for bringing water to it from the lake district of Cumberland. In connection with this, a writer in the "Times" of September 5, 1877, who states that he is an old resident at Thirlmere, affirms that no resident on Thirlmere ever thinks of drinking the water of the lake.

On the question of the search for water, a treatise has been published by E. Spon, "On the Practice of Sinking and Boring Wells."

Much interest was caused this year by the attempt of Messrs. Meux to get water from the green sand at their brewery in London. After boring to more than 1,000 feet, the attempt had to be abandoned, as no water was found. It is still, however, believed by many that an ample supply could be got for London by means of artesian wells.

A good instance of the danger of shallow wells is given by Dr. Cameron in the "Dublin Journal of Medical Science." At Glenfarne Hall, co. Fernmanagh, a much more impure water (organically) is obtained from the surface of the well than from the bottom; the surface water yielding 0.025 of organic nitrogen, against 0.006 at the bottom; the chlorine was also greater at the surface, although the other mineral constituents were greatest at the lowest depth.

2. *Air, Ventilation, &c.*—In my last report I referred to an examination I had made at St. Mary's Hospital, Paddington. Since that time extensive alterations have been carried out, and a second examination showed a marked improvement in the general condition. The Hospital was built upon a bad plan, with most of the defects of structure common to hospitals built before the last fifteen or eighteen years. Most of the wards had windows only on one side, whilst the few that had windows on opposite sides were large and broad, so that the advantage was to a great extent lost. The centre of the building is an immense space, containing the main staircase; it was hardly ventilated at all, but with it and adjoining lobbies and corridors, the most of the wards communicated by means of windows. The consequence was that it became a sort of well in which all the foul air of the building was mixed up, and from which it was redelivered into the wards. Its condition may be judged by the amount of  $\text{CO}_2$  in excess over the outer air ratio: this was—

|              |      |                 |                                                                                                                                                            |
|--------------|------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ground floor | .... | 0.439 per 1,000 | } or a mean impurity of 0.447 per 1,000, indicating a supply of 1,350 cubic feet of fresh air per head per hour, barely one-third of the necessary amount. |
| First        | "    | 0.370           |                                                                                                                                                            |
| Second       | "    | 0.531           |                                                                                                                                                            |

After the improvements were carried out, the result of examination showed a mean impurity of only 0.026, indicating an almost unlimited supply of fresh air. Besides the bad shape and arrangement of the wards, they were encumbered with sinks and sculleries inside, which took up space and obstructed ventilation. The waterclosets also opened directly into the wards, and there was always a strong in-current through them. The improvements suggested were the following: The closing up of all communications between the wards and other parts of the house, except the doors, which were to be kept closed. The removal of all sinks, sculleries, &c., from the wards. The separation of the closets by means of ventilated vestibules, the closets themselves being in an annexe. The introduction of additional ventilators, such as Sheringham valves, in the outer walls, and ventilating tubes (known as Tobin's) in every part that was accessible. These points were carried out to the great improvement of the Hospital generally, although some difficulties were encountered, such as a tendency to stop up the ventilators on the part of nurses and patients, and a difficulty of keeping up the temperature in the winter months. The most marked improvement was shown in the amount of organic matter in the air, there being a diminution of 27 per cent. in the albuminoid ammonia, and a proportionate lessening of other constituents. The microscopic examination of the air was interesting, especially in the accident ward: this is a square ward, which had a dividing screen down the centre; beds were placed on each side of this screen. It was noticed that patients placed in certain of those beds got erysipelas, whilst those opposite did not. On examining the air, it was found that it was more impure there than in any other part, showing, in fact, that the patients were receiving only 1,560 cubic feet of air per head per hour, whilst in other parts they were receiving 2,500 and even 3,660. At that part, also, pus-cells were actually detected by the microscope. The reports, with a number of microscopic illustrations, have been printed and circulated by the Hospital Committee.

Another inquiry, conducted by me this year, was at University College Hospital, a building also in a very insanitary condition. In this case also curious results were brought out by the microscopic examination, especially in the atmosphere of the dirty-linen area, where not only pus was found in quantity, but also numerous fatty crystals apparently from greasy dressings. Bacteria were also found in large quantity, both free and in the zooglycal form.

The rebuilding of the Hospital is spoken of, and it is much to be hoped that this may be carried out.

Another inquiry of great interest was undertaken by Mr. Netten Radcliffe, at the Manchester Royal Infirmary, also a building in the old style, in the centre of a crowded city. Mr. Radcliffe's report is most full and exhaustive, showing in the clearest way the defects of the existing structure. It is a most valuable document, well worth the attention of all who are interested in the subject. The building of a new infirmary is inevitable, the point in dispute at present being whether they shall rebuild on the existing site, or move out or town altogether. The latter seems to commend itself on many grounds, chiefly on account of the advisability of leaving the crowded atmosphere of the city, and also on account of the immense pecuniary value of the existing site, the price of which would enable a noble infirmary to be built out of town, and provide at the same time a receiving house in the town for emergencies.

There exist in Manchester two very good types of Hospitals, viz., the Clinical Hospital, chiefly for children, and the Children's Hospital at Pendleton; the former is small, but very well arranged; the latter contains about 80 beds, and is capable of extension, being on the pavilion plan. The heating apparatus is a propulsion arrangement, like those at Lariboisière and the new Hôtel-Dieu at Paris, by which it is said that the wards can be heated up to 80°F. with very little trouble.

In March last I paid a visit to some of the Paris Hospitals, for the purpose of seeing any alterations in ventilation or arrangement. At Lariboisière I found that during the previous winter one of those accidents had occurred which render artificial methods of ventilation so unsatisfactory. The floods, consequent on the overflow of the Seine, had undermined some of the piers supporting the basement and broken the propulsion apparatus; the consequence was that for a considerable time the ventilation arrangements were at a standstill. This hospital, large as it is, is insufficient for the wants of the quarter in which it stands; it is almost always full, and I was surprised to find that, yielding to the pressure of applications, they had placed a third line of beds, end to end, in the centre of the wards in several instances, thus to a large extent neutralising the good effects of the pavilion system. Such a proceeding is wholly retrograde, and cannot be too strongly reprehended. At the new Hôtel-Dieu the general plan is much the same as that of Lariboisière, and reproduces most of its defects. There is less space around the building than is desirable (a defect, however, inseparable from its situation in the heart of Paris), and the centre court has a somewhat crowded appearance, a good deal being sacrificed to a pretentious *cour d'honneur*. The closet arrangements do not seem to be on the best plan, not being sufficiently shut off from the rest of the building, and the so-called *salles d'isolement* are entirely misnamed, not being isolated in the least. The ventilation is carried on by a pumping apparatus, the air being drawn down a lofty shaft, carried up the end of the building. Although the building is a great improvement on the old building it is to replace, it still leaves much to be desired as a model of hospital construction.

On the subjects of ventilation, warming, construction, &c., the following works have been published:—

Bosc, Ernest, "Traité complet, théorique et pratique, du chauffage et de la ventilation des habitations particulières et des édifices publics. Paris, A. Morel & Cie.

"Hospital Plans, Five Essays relating to the Construction, Organisation, and Management of Hospitals," contributed by their authors for the use of the Johns Hopkins Hospital of Baltimore. Baltimore, Wood and Co.

Eassie, W. "Sanitary Arrangements for Dwelling-houses." Smith and Elder.

Leeds, L. W. "A Treatise on Ventilation." New edition. Philadelphia, Wiley.

Drysdale and Hayward. "Supplement to Health and Comfort in House-building." London, Spon.

Feltzer, M. "Kriegslazareth-Studien." Berlin, Hirschwald.

Wolfhügel, Gustav, Dr. "Ueber die Prüfung von ventilations apparaten München." Druck von Mühlthaler.

Jansen, A. Contribution à l'étude de l'hygiène des hôpitaux militaires et des casernes. Bruxelles, H. Manceaux.

With regard to the external air, an important series of inquiries is being carried on in different directions. In Paris, at Montsouris, daily analyses of the air have now been made for some time, under the direction of M. Marié Davy; and lately, in London, arrangements have been made by the Meteorological Committee for the establishment of a section of sanitary meteorology, from which we may hope to derive useful information. At Glasgow, analyses of the town air are made three times a-week, by Mr. E. M. Dixon, B.Sc., in co-operation with the Medical Officer of Health. Two monthly reports have already appeared (for May and June, 1877), and the care with which they seem to be prepared is very commendable. It would be a great advantage if those observations could be carried on at other stations, both in this country and elsewhere, especially at our numerous foreign stations, where meteorological observations are already established. It is only by such multiplication of observations that we can hope to obtain data proper for tracing out the laws which govern the spread of disease. It would be necessary to combine microscopic with chemical analysis before all the required information could be collected. As regards the Glasgow observations, some of the points are curious and differ from those observed elsewhere. Thus, in the most crowded part of Glasgow (Calton) the mean nitrogen in the air, as free ammonia, was, for May, 0·067 milligrammes per cubic metre, and the nitrogen, as albuminoid ammonia, 0·081. Mr. Moss's results\* in the neighbourhood of Portsmouth Hospital, gave 0·077 and 0·073 respectively, although it is a comparatively open space. Angus Smith, in London, found the nitrogen, as albuminoid ammonia, to average 0·124, and his mean of Glasgow air was 0·250; even at Innellan (Frith of Clyde) he found 0·112. In London I found, in damp and still air, 0·294 free and 0·432 albuminoid; and in dry, warm, breezy air 0·013 free and 0·421 albuminoid. The effect of wind in clearing the air is noticed by Mr. Dixon, and also the influence of rain-fall as deserving marked attention. As regards the CO<sub>2</sub>, his results also differ greatly from those of Angus Smith, who found an average of 5·02 per 10,000 volumes in the Glasgow air, whereas the maximum given by Mr. Dixon is only 3·43, while the mean of all his observations is only 2·98. Assuming that the observations are equally accurate and under similar conditions, the difference shows the necessity for continuous inquiry into the whole question.

3. *Drainage, Sewage Disposal, &c.*—On these subjects much has been written, and a good deal of controversy has gone on in the different journals. The question of ventilation of sewers and soil pipes has been much discussed, different inventors keenly advocating their own systems. Of those the system of Banner has attracted some attention, and has been applied, among other places, to Guy's Hospital. The essential part of it is an uptake ventilating shaft from the soil pipe, surmounted by an aspiratory cowl; a current of air is established, either through a trap below or by drawing air down another shaft furnished with a cowl acting the reverse way. Other inventors have suggested arrangements to accomplish the same end. Professor Macdonald has constructed a very ingenious cowl, called a twin-fan ventilator, which establishes and keeps up a double current in a shaft, and may be used either for house or sewer ventilation, or on board ship for ventilating between decks or in inaccessible parts of the ship.

Professor Frankland ("Proceedings of the Royal Society, 1877"), has made some ingenious experiments with a view of throwing some light on the condition of the air in sewers. His object was to ascertain how far it was possible for solid or liquid particles to be scattered into the air from the sewage as it flowed along. By using a solution of a salt of lithia he was able to detect very minute quantities by means of the spectroscope. The results found were, that, by agitating the water mechanically to a much greater degree than sewer water ever could be agitated under any circumstances, it was not possible to scatter the liquid into the air sufficiently to be detected even by spectroscopic tests. On the other hand, when gas was generated in the liquid, as by the artificial production of carbonic acid, so as to simulate the conditions of putrefaction,

\* I have reduced these and the other observations to nitrogen, to correspond with Mr. Dixon's figures.



lithia was at once detected in the air. This is an additional proof of the dangers to be apprehended from the retention of sewage in drains and cesspools, and an additional argument, if any were needed, for its speedy and instant removal from the neighbourhood of habitations.

The great works going on for the improvement of the city of Paris in the matter of water supply and sewerage are described in detail in the three large fasciculi, published by the house of Gauthier-Villars, "Sur l'assainissement de la Seine." As is well known, the sewers of Paris do not receive the excreta of the population, but merely the surface or slop waters, street washings, &c., yet this liquid is of value, and is now disposed of by means of irrigation over the peninsula of Gennevilliers. This laud is also partly watered by the liquid from the nightsoil proper. This last is still received into cesspits, which are emptied periodically and the produce removed for manufacture into poudrette. For drinking, the use of the Seine and the Canal de l'Ourcq are now almost quite given up, the water of the Vanne being employed. An abstract of the recent measures was published in the "Annales des ponts et chaussées," and has been translated into English by Mr. R. Manning. This translation (which also refers to the "Assainissement de Berlin") is not very well done, and contains some errors (perhaps due to the printer) which make it not very easy to understand in some parts.

At home a report on the disposal of sewage in towns has been presented by the Committee appointed by the President of the Local Government Board. The Committee consisted of Mr. Rawlinson and Mr. C. S. Read. They have reported in some detail, with plans, on the manner of sewage disposal in the chief towns in England, and in some of the continental towns. The conclusions arrived at by the Committee are given in page 12 of the Report and may be summarised as follows:—

- (1.) Scavenging, cleansing and sewerage are necessary.
- (2.) Retention of refuse and excreta in cess-pits and middens is condemned; even the pail and dry earth systems are merely palliations, although they may be tolerated in small and isolated places.
- (3.) Sewering and draining of towns are a prime necessity, both for cleansing and for lowering and preserving from pollution the subsoil water.
- (4.) Refers to pollution of rivers and streams (provided for in Act of 1877).
- (5.) Considers existing modes of treatment of sewage by deposit and chemicals in tanks more or less of a failure, but that they effect some good and are susceptible of improvement.
- (6.) None of the manufactured manures from town refuse pay the cost of production.
- (7.) Town sewage may be best disposed of by irrigation over land.
- (8.) Irrigation is not possible everywhere, therefore other plans must be admitted.
- (9.) Discharge into the sea may be allowed provided no nuisance is caused.

Among the plans not noted in this inquiry is that carried out in Manchester, on the plan of Mr. Fryer. This deals with all the town refuse; the coarser parts, such as fragments of pottery, bits of glass and metal, &c., are burnt to slag in a furnace, which he calls the *Destructor*: the vegetable refuse, condemned food, &c., are reduced to charcoal in another apparatus called the *Carboniser*, and the night-soil proper is concentrated in the *Concretor* (without loss of ammonia) to a small bulk, which is valuable as manure. The slag from the first process is ground and, along with lime, made into mortar. The plan is well spoken of in Manchester, and, if it succeeds, it certainly gets rid of everything in a very effectual way.

The Report of the Committee, above referred to, speaks of the Liernur system of sewage in a very disparaging way, more so, I think, than the existing evidence warrants. In a visit paid to Holland last autumn I had an opportunity of seeing the system in work at Leyden, and had it explained to me by the kindness of the late Professor Boogaard. Although applied to a small portion of the town it seems to be very effectual, and, from what I was told, has apparently abolished enteric fever in that district. With regard to smell, which has been complained of, I was present in some of the closets at the moment the contents were sucked away by the apparatus and there was not the smallest odour. I

also saw the material passed from the main receiver into the casks for sale, and there was no odour even there, on account of the ingenious method employed. Some difficulty has certainly been experienced in disposing of the material in the semi-liquid state, but at Dordrecht it is made into *poudrette*, apparently at a profit. The Committee dwell upon the expense, which they state, on the authority of the Director of Works at Amsterdam, to be about six or seven shillings per head per annum, including interest on the original outlay. This is considerable, but by no means excessive if all that is claimed for the system, on sanitary grounds alone, is borne out in practice; it would amount roughly to a sixpenny or sevenpenny rate quarterly. In the meantime arrangements are actually being made for its further extension in Amsterdam itself, whilst the patent has been purchased for Austria and Hungary by the Vienna Joint Stock Agricultural Society, who consider it a success, both hygienically and financially. It certainly seems well adapted for a country like Holland, where a *fall* for drainage is almost impossible, and there are a good many places in this country similarly circumstanced. The Committee say they do not know any town in England where the apparatus, if adopted, would be other than a costly toy; I would cite such a town as Southport, in Lancashire, where the drainage fall is about 1 in 5,000, a difficulty that is being most ingeniously got over by the works at present constructing, but which might perhaps have been overcome even more effectually by the pneumatic system. The concluding paragraph of the remarks in the Report (p. 25) about the liability of the apparatus to get out of order are in direct opposition to the statements of the inventor, and certainly to some of the experience also. The last sentence is not very easy to understand: "The power of air and water to remove solids through pipes being" as their relative weights and velocity, and air is to water by weight, about as "800 to 1."

Mr. Bailey Denton has published, under the title of "Sanitary Engineering," a considerable volume, the basis of which is a course of lectures on the subject delivered at the School of Military Engineering. It is copiously illustrated and deals with most of the subjects that come within the province of the engineer. The section on drainage is particularly detailed, and the whole forms a valuable book of reference for all persons interested in sanitary matters.

4. *Food, &c.*—The provisions of the Adulterations Act have been applied pretty extensively and with apparent good effect. There are still some points of difficulty connected with the detection of adulterations, but these are being gradually cleared up. One of the most difficult investigations has been the analysis of *butter*, so as to detect the introduction of foreign fats. None of the former plans were trustworthy, and accordingly, a few years ago, a process was introduced by Messrs. Angell and Hehner, in which they determine, by saponification, the relative proportions of volatile and fixed fatty acids, which they found to be a fairly constant ratio in real butter, and different from that of other fats. In the first edition of their work on Butter Analysis, they adopted the percentage of fixed acids in butter as 85, but in the 2nd edition (published this year) they put it at 87.5, the average of other fats being about 95. One great objection to the method was the length of time required (several hours) to complete the saponification, as this rendered it less easy for general use. Mr. Turner, the public analyst and health officer of Portsmouth, suggested an ingenious method which has got over the difficulty. Perceiving that it was the slow solution of the fats that delayed the saponification when water was used, it occurred to him to try alcohol, which he found quite successful, the saponification now taking minutes instead of hours, so that the process can be used by analysts without great expenditure of time. It seems to have been pretty generally accepted as fundamentally correct. The essential part of the process is the saponification of the fatty acids, the decomposition of the soaps with hydrochloric acid, the separation of the volatile acids by means of heat or boiling water, and the weighing of the fixed residue.

*Bread.*—In calculating out diets into which bread enters largely some difficulty is experienced in reconciling the statements in books with the actual results as found in practice. The chief points are these:—

- (1.) How to reckon the weight of bread with reference to the length of time it has been baked, which involves the question of the average loss undergone in the process of cooling.

(2.) How to calculate the relative proportions of crust and crumb, and the ratio the composition of the one bears to the other.

These questions are very important as bearing upon the amount and quality of rations, and I have therefore made some experiments upon the Hospital ration bread as baked and issued at Netley. The following are the results as bearing upon the above questions :—

1. It has generally been understood that the weight of bread is to be reckoned as it comes hot from the oven, from which time it loses weight steadily until it becomes dried up. Of course the rapidity with which this takes place varies with the temperature, humidity and movement of the surrounding air, and the way in which the bread is baked. The average loss (as stated in the "Manual of Hygiene") is taken as follows :—

|     |          |      |      |               |
|-----|----------|------|------|---------------|
| 1st | 24 hours | .... | .... | 2.0 per cent. |
| In  | 48 "     | .... | .... | 7.8 "         |
| "   | 60 "     | .... | .... | 11.0 "        |
| "   | 70 "     | .... | .... | 14.0 "        |

At Netley the bread is baked in 2lb. loaves, each weighing over 900 grammes up to 940 or 950. A batch of 800lbs. of dough is worked up into  $21 \times 19 = 398$  loaves; of this oblong batch 4 are corner loaves, with four sides out of six crust; 76 are side loaves, with three sides out of six crust; and 318 are inside loaves, with only two sides (top and bottom) crust. This gives the following proportion :—

|                  |     |
|------------------|-----|
| $4 \times 4 =$   | 16  |
| $76 \times 3 =$  | 228 |
| $318 \times 2 =$ | 636 |
| <hr/>            |     |
| 398)             | 880 |

$2.21 =$  the average proportion of crust out of the six sides of the loaf, or a percentage (taken in this rough way) of 37 of crust. This does not represent the real percentage by weight, which will be considered afterwards. A new loaf (inside) baked at noon on June 30th, was found to weigh 873 grammes at 1 p.m. Supposing it to have weighed 900 at noon, it had lost 17 or nearly 2 per cent. in one hour. As it was not actually weighed when hot this cannot be taken as positive. On July 9th a new (inside) loaf weighed 946; when cold, in 2½ hours, it weighed 921, or a loss of 25, equal to 2.6 per cent., or about 1 per cent. per hour. The crust and crumb separated and broken up had lost 121, or 13 per cent. in 48 hours. Another (inside) loaf on July 10th, weighed, when hot at 1 p.m., 896 grammes; its changes of weight were carefully noted, and were as follows :—

| Weight at    |               |     |      | Loss,  |           | Mean per cent. of |
|--------------|---------------|-----|------|--------|-----------|-------------------|
| (July 10th). | 1 p.m. (hot)  | 896 |      | total. | Per cent. | loss per hour.    |
| 2 "          | ....          | 880 | .... | 16     | 1.78      | 1.78              |
| 3 "          | ....          | 875 | .... | 21     | 2.34      | 1.17              |
| 4 "          | ....          | 867 | .... | 28     | 3.12      | 1.04              |
| 5 "          | ....          | 864 | .... | 32     | 3.58      | 0.89              |
| 6 "          | ....          | 862 | .... | 34     | 3.80      | 0.76              |
| 7 "          | ....          | 862 | .... | 34     | 3.80      | 0.63              |
| 8 "          | ....          | 863 | .... | 36     | 4.00      | 0.57              |
| 9 "          | ....          | 860 | .... | 36     | 4.00      | 0.50              |
| <hr/>        |               |     |      |        |           |                   |
| Weight       | 3 "           | 847 | .... | 49     | 5.47      | 0.21              |
| (July 11th)  | in 26 hours.  |     |      |        |           |                   |
| (July 12th)  | 12 noon       | 819 | .... | 87     | 9.72      | 0.13              |
|              | in 72 hours.  |     |      |        |           |                   |
| (July 16th)  | 1 p.m.        | 785 | .... | 121    | 13.82     | 0.09              |
|              | in 145 hours. |     |      |        |           |                   |

There is thus a loss of 3 per cent. in the first three hours, that is during the cooling of the loaf, a result corresponding to that obtained from the previous experiment. 24 hours entails a loss of  $6\frac{1}{2}$  per cent., which is nearly doubled in 72 hours or three days.

An outside corner loaf, four sides crust, was weighed on July 10th :—

| Hot at 1 p.m. | .... | 841 | Loss,<br>total. | Per cent. | Mean per cent. of<br>loss per hour. |
|---------------|------|-----|-----------------|-----------|-------------------------------------|
| 2             | "    | 830 | 11              | 1.31      | 1.31                                |
| 3             | "    | 825 | 16              | 1.90      | 0.95                                |
| 4             | "    | 825 | 16              | 1.90      | 0.62                                |
| 5             | "    | 825 | 16              | 1.90      | 0.47                                |
| 6             | "    | 824 | 17              | 2.02      | 0.40                                |

This loaf was rather under weight to start, but that does not invalidate the experiment. We see here that the loss of weight in cooling is only 1.9 per cent. instead of 3, and that in 5 hours it lost only 2 per cent., whilst the inside loaf lost 3.8, nearly double. When the crust and crumb were separated the loss (total) in 31 hours was 66 or 7.9 per cent., the actual loss after breaking up being, in 24 hours, 37, or 4.4 per cent.; of this the crumb lost 33, or 6.2 per cent., and the crust 4, or 1.6 per cent.

Another loaf, baked as a cottage loaf with crust all over, was also weighed. Weight of cottage loaf hot:—

| (July 10th) 12 noon.... | 906 | Loss,<br>total. | Per cent. | Mean average per cent.<br>of loss per hour. |
|-------------------------|-----|-----------------|-----------|---------------------------------------------|
| 1 p.m. ....             | 905 | 1               | 0.11      | 0.11                                        |
| 2 " ....                | 905 | 1               | 0.11      | 0.05                                        |
| 3 " ....                | 900 | 6               | 0.66      | 0.22                                        |
| 4 " ....                | 897 | 9               | 0.90      | 0.23                                        |
| 5 " ....                | 896 | 10              | 1.21      | 0.22                                        |
| 6 " ....                | 876 | 10              | 1.11      | 0.18                                        |

When crust and crumb were separated and broken up the total loss in 7½ hours had reached 18, or 1.99 per cent.; after 31 hours the loss was 66, or 7.3 per cent.; the actual loss, after breaking up, being, in 24 hours, 48, or 5.4 per cent.; of this the crumb lost 44, or 6.9 per cent., and the crust 4, or 1.95 per cent. These results are very accordant with the preceding ones, although there seems rather a sudden change at the third hour after baking. It is to be noted that, although this loaf was all covered with crust, the crust was thinner than in the case of the ordinary ration outside loaf.

From the above we find that the amount of crust has great influence on the weight, 1st, by preventing evaporation, and, 2nd, on account of there being originally less water in the loaf. An inside loaf, with only top and bottom crust, loses about 3 per cent. in cooling, and about 4 in the first 5 or 6 hours. An outside corner loaf (four sides crust) loses about 2 per cent. in cooling, and the loss is little greater at the end of 5 hours. A cottage loaf, all crust on the outside, loses only about ½ per cent. in cooling, and only about 1 to 1½ in 5 hours. Taking ration bread there is a loss of about 1 per cent. in weight in the first 5 hours for every side that is not crust. It is thus evidently advantageous that the ration should be well baked, 1st, that the soldier should get as much weight of food as possible, and, 2nd, that the loss of weight or drying should be delayed as long as possible, so that the bread may remain fresh and palatable.

2. The second question, as to the proportions (by weight) of crust and crumb, is one of great importance. It is laid down that the crust should not be less than 30 per cent., and certainly this is desirable, but it seems to be seldom attained. I have carefully weighed the crust of several loaves with the following results:—

An inside loaf (two sides crust) weighed an hour after baking, 873 grammes; the crust and crumb were carefully separated and weighed:—

|            |     |                                      |     |
|------------|-----|--------------------------------------|-----|
| Crust .... | 174 | This gave a percentage of crust .... | 20  |
| Crumb .... | 696 | " of crumb ....                      | 80  |
| Total      | 870 | Total                                | 100 |

There was thus a loss of 3 grammes in the cutting up.

Another similar loaf weighed 946 grammes, hot; it was cut up and the crust separated and weighed after it had got cold:—

|            |     |                                                   |       |
|------------|-----|---------------------------------------------------|-------|
| Crust .... | 137 | In cooling and cutting up it had lost 22 grammes. |       |
| Crumb .... | 787 | This gave 14.8 per cent. of crust, and            |       |
|            |     | 85.2 " of crumb.                                  |       |
| Total      | 924 | Total                                             | 100.0 |

Another similar loaf, received 4 hours after baking, weighed 900 grammes. Crust and crumb separated gave:—

|            |     |                          |       |
|------------|-----|--------------------------|-------|
| Crust .... | 140 | Percentage of crust .... | 15.6  |
| Crumb .... | 757 | „ of crumb ....          | 84.4  |
| Total      | 897 | Total                    | 100.0 |

Again a loss of 3 grammes on breaking up.

We thus have three determinations of crust, viz., 20, 14.8, and 15.6, which give us a mean of 16.8 per loaf. As each of the three loaves had only 2 sides crust out of 6, we may reckon for each side of crust 8.4 per cent.

An outside loaf, with four sides crust, was weighed hot, and showed 841 grammes. After 6½ hours it was cut up and crust separated:—

|            |     |                          |       |
|------------|-----|--------------------------|-------|
| Crust .... | 254 | Percentage of crust .... | 31.5  |
| Crumb .... | 558 | „ of crumb ....          | 68.5  |
| Total      | 812 | Total                    | 100.0 |

A loss of 29 since baking.

In this case the proportion of crust per side is 7.9.

In the cottage loaf, which may be taken as having six sides crust, the weight, hot, was 906. The crust was separated 6½ hours after baking and the weighing gave:—

|            |     |                          |       |
|------------|-----|--------------------------|-------|
| Crust .... | 209 | Percentage of crust .... | 23.6  |
| Crumb .... | 679 | „ of crumb ....          | 76.4  |
| Total      | 888 | Total                    | 100.0 |

A loss of 18 since baking.

Here the amount per side would be much smaller, about 4 per cent., but the crust was much thinner than in the case of the regular ration loaf. Taking, therefore, the previous experiments we have:—

|                                                 |      |                       |
|-------------------------------------------------|------|-----------------------|
| Percentage of crust per side from inside loaves | .... | $8.4 \times 3 = 25.2$ |
| „ „ outside „                                   | .... | $7.9 \times 2 = 15.8$ |
| Total                                           | .... | 541.0                 |

Mean percentage per side = 8.2

From this we may get the mean amount of crust in the rations generally, starting from the proportions of the batch already mentioned.

|                                        |      |           |
|----------------------------------------|------|-----------|
| 4 corner loaves, 4 sides of crust each | .... | 16 sides. |
| 76 side „ 3 „ „                        | .... | 228 „     |
| 318 inside „ 2 „ „                     | .... | 636 „     |
| 398 loaves                             | .... | 880 „     |

This gives (as before stated) 2.21 sides of crust. Multiplying by 8.2, as above, we have  $2.21 \times 8.2 = 18.12$  per cent. of crust by weight. This is apparently very small compared with what is usually expected, and what indeed ought to be. It is evident that the baking is insufficient, or that the bread is baked in too large batches.

The next point to ascertain was the proportionate amount of water-free solids in the crust and the crumb:—

Percentage of water-free solids.

|                | Crust.  | Crumb.  |
|----------------|---------|---------|
| 1st experiment | 90.02   | 65.36   |
| 2nd „          | 93.30   | 60.60   |
| 3rd „          | 85.80   | 62.30   |
| 4th „          | 91.71   | 64.49   |
|                | 4360.83 | 4252.75 |
| Mean           | 90.21   | 63.19   |

From this we may get the mean water-free solids of a loaf :—

|                         |                                 |         |
|-------------------------|---------------------------------|---------|
| Percentage of crust     | $18.12 \times 90.21 \div 100 =$ | 16.346  |
| „ of crumb              | $81.88 \times 63.19 \div 100 =$ | 51.740  |
| Total water-free solids | =                               | 68.086  |
| Water                   | ....                            | 31.914  |
| Total                   |                                 | 100.000 |

i next determined the nitrogen by the soda-lime process, and obtained the following results :—

Nitrogen per cent. in water-free solids.

|                | Crumb. | Crust.  |                                                                  |
|----------------|--------|---------|------------------------------------------------------------------|
| 1st experiment | 1.5100 | (1.174) | In this case I found the tube had burst, so that there was loss. |
| 2nd „          | 2.0315 | 2.0321  |                                                                  |

I think it will be safer to take the second experiment, both because I am more satisfied of its accuracy, and also because of the accordance of the two results. Multiplying the above numbers (which are practically identical) by 16.8 we obtain the relative amount of dry albuminate, viz., 12.8 per cent. We thus have :—

$$\begin{array}{l} \text{Crust } 16.346 \times 12.8 \\ \text{Crumb } 51.740 \times 12.8 \end{array} \div 100 = 8.715 \text{ per cent.}$$

This is somewhat higher than the table given in the “Manual,” but the per centage of water-free solids is also higher.

My determinations of the fat failed, and I had not time to repeat them. The ash was determined and gave the following :—

|                 |      |      |       |
|-----------------|------|------|-------|
| Crumb (undried) | .... | .... | 1.958 |
| Crust ( do. )   | .... | .... | 1.984 |
| Mean            | .... |      | 1.967 |

This seems rather high compared with published analyses.

Another point of some interest is the amount of acidity in bread. This has never been dealt with in a definite way and no rule has been laid down. The plan adopted was to digest a weighed quantity of crumb and of crust in a certain amount of water, say 10 grammes to 100 ccs., and then titrate with standard alkaline solution, using cochineal as the indicator. The results were stated as crystallised oxalic acid :—

|                | Crumb (undried). | Crust (undried). |           |
|----------------|------------------|------------------|-----------|
| 1st experiment | .... 0.063       | .... 0.034       | per cent. |
| 2nd „          | .... —           | .... 0.066       | „         |
| 3rd „          | .... 0.057       | .... 0.057       | „         |
| Mean           | .... 0.060       | .... 0.052       | „         |

Taking the proportion of crust and crumb, we have in a loaf :—

|                 |      |      |       |
|-----------------|------|------|-------|
| Acid of crumb   | .... | .... | 0.049 |
| „ of crust      | .... | .... | 0.009 |
| Total per cent. |      |      | 0.058 |

This is equal to 4.06 grains of crystallised oxalic acid in each pound of bread, or 16.24 per 4lb. loaf. In case it should be considered desirable to state it in terms of glacial acetic acid, the numbers would be :—

$$\begin{array}{l} 0.055 \text{ per cent.} \\ 3.85 \text{ grains per lb.} \\ 15.40 \text{ „ per 4lb. loaf.} \end{array}$$

This might be adopted provisionally as a standard for fresh bread.

The final results therefore are these:—

|                                           |                |
|-------------------------------------------|----------------|
| Water ....                                | 31 830         |
| Water-free solids .....                   | 68 170         |
| Albuminates .....                         | 8 726          |
| Fat (adopted from published analyses).... | 1 500          |
| Ash .....                                 | 1 967          |
| Carbo-hydrates (by difference) ....       | 45 977         |
| * * Acidity (as acetic acid) ....         | 0 055          |
| <b>Total ....</b>                         | <b>100 000</b> |

There would be a clear gain to the soldier if his bread were more baked; he would get better weight, it would keep better, and would be more nourishing. On service the plan of preparing *pain biscuité* (as in the French army) might be advantageously adopted, it being decidedly more palatable and digestible than biscuit.

Connected with the question of food, two events have greatly excited public interest and attention, viz., the unfortunate termination of the Arctic Expedition and the Indian Famine, which is still in operation. The story of the former event has been told in full detail in several publications, and the voluminous Report of the Committee appointed to inquire into the causes of the scurvy that broke out contains a mass of most valuable information. The Report of the Committee was to the effect that the outbreak of scurvy in the sledge parties was due to want of lime juice. During the winter on board the ships the crews had received ample rations, containing a good supply of antiscorbutics, such as dried potato, compressed and preserved vegetables, pickles, raisins and currants, bottled fruits, and a daily ration of one ounce of lime juice. On the sledge parties all these were cut off except two ounces of preserved potato. The result was what had been foreseen by Sir Alexander Armstrong, and might have been confidently predicted by any one who had studied the question, namely, an outbreak of scurvy that proved fatal in four cases, seriously endangered the whole of the crews, and rendered the expedition a comparative failure. The work the men had to do was enormous, and in my evidence before the Committee I tried to calculate it out. The result was, of course, only approximate, but it showed that what was done was more than the rations consumed could supply in potential energy. On the whole, the inquiry has had the effect of placing the subject on such a solid basis that we are not likely to have a similar disaster again. At the same time, the evidence showed that there are still some unexplained points on the subject of scurvy which deserve careful investigation.

In the Report of last year reference was made to the views of Mr. Galloway on the importance of phosphate of potash in scurvy. A second edition of his pamphlet has been published with additional notes; it is, however, not more convincing than the former. Mr. Anderson (of Coventry) has published a pamphlet also advocating phosphates as the cure for scurvy; his contention is that lime juice cures because it renders the insoluble phosphates soluble, citric acid being a better solvent than any other. The theory is ingenious, but does not seem very probable.

The famine in Madras is important as vindicating the truth of the principles of diet already laid down from scientific inquiry. Sir Richard Temple assumed that it was possible to feed the people on a smaller amount than was given in the Bengal Famine, and accordingly only 1lb. of grain was given instead of 1½lbs., besides half an anna for the purchase of condiments. This amount was barely sufficient to maintain life in a state of rest, but was utterly inadequate for even a moderate amount of labour. The result was that, task-work being demanded of those people, they perished by thousands. The question was most ably and courageously discussed by Dr. Cornish, the Sanitary Commissioner of Madras, whose views have fortunately ultimately prevailed. The correspondence between him and Sir Richard Temple is well worthy of perusal. On this point Dr. Lyon, Chemical Examiner to the Government of Bombay, has furnished a very important memorandum on the work done and the diet supplied in the prisons of Bombay. The matter is most carefully treated, and the paper will form a valuable work of reference on the subject.

There are many other points of interest in several branches of hygiene which must however be deferred till a future time.

## APPENDIX No. II.

## LIST OF OPERATIONS PERFORMED AT THE ROYAL VICTORIA HOSPITAL, NETLEY, DURING THE YEAR 1876, WITH SHORT ABSTRACTS OF THE MORE IMPORTANT CASES.

By Surgeon-Major J. H. PORTER, A.M.D., Assistant Professor of Military Surgery.

| Operations.                                               | Number of Cases. | Disease.                                                                                   | Result.     |            |              |       | Remarks.                                 |
|-----------------------------------------------------------|------------------|--------------------------------------------------------------------------------------------|-------------|------------|--------------|-------|------------------------------------------|
|                                                           |                  |                                                                                            | Successful. | Otherwise. | In Hospital. | Died. |                                          |
| <i>Amputations.</i>                                       |                  |                                                                                            |             |            |              |       |                                          |
| Ankle joint, left, Parry's modification of Symes' method. | 1                | Caries of tibio tarsal articulation and tarsal bones.                                      | ...         | ...        | ...          | 1     | See Case No. 1.                          |
| Symes', of the right foot ...                             | 1                | Ditto ... ..                                                                               | 1           | ...        | ...          | ...   |                                          |
| Forefinger, right hand ...                                | 2                | Contraction of forefinger, right hand.                                                     | 2           | ...        | ...          | ...   |                                          |
| <i>Excision of Joints.</i>                                |                  |                                                                                            |             |            |              |       |                                          |
| Left elbow joint ... ..                                   | 2                | Caries and necrosis of condyles left humerus and articulating surfaces of radius and ulna. | 2           | ...        | ...          | ...   | See Cases Nos. 2 and 3.                  |
| Head of femur ... ..                                      | 1                | Caries of head of right femur, which was dislocated on the dorsum ilii.                    | 1           | ...        | ...          | ...   | See Case No. 4.                          |
| <i>Urinary Organs.</i>                                    |                  |                                                                                            |             |            |              |       |                                          |
| Radical Cure of Stricture, Holt's                         | 2                | Stricture of urethra ...                                                                   | 2           | ...        | ...          | ...   | See Remarks on Stricture of the Urethra. |
| Division of stricture ... ..                              | 1                | Ditto ... ..                                                                               | 1           | ...        | ...          | ...   |                                          |
| By dilatation ... ..                                      | 31               | Ditto ... ..                                                                               | 29          | ...        | 2            | ...   |                                          |
| Puncture of the bladder ...                               | 1                | ... ..                                                                                     | 1           | ...        | ...          | ...   | See Case No. 5.                          |
| <i>Genital Organs.</i>                                    |                  |                                                                                            |             |            |              |       |                                          |
| Tapping and injecting with iodine.                        | 14               | Hydrocele ... ..                                                                           | 14          | ...        | ...          | ...   |                                          |
| Symes', for fungus of testicle ...                        | 1                | Hernia of left testicle ...                                                                | 1           | ...        | ...          | ...   |                                          |
| <i>On the Anus.</i>                                       |                  |                                                                                            |             |            |              |       |                                          |
| Removal by Smyth's clamp and actual cautery.              | 6                | Hæmorrhoids ... ..                                                                         | 6           | ...        | ...          | ...   |                                          |
| Division of sphincter ... ..                              | 8                | Fistula in ano ... ..                                                                      | 8           | ...        | ...          | ...   |                                          |
| Removal of necrosed bone ...                              | 3                | Disease of bone (necrosis)                                                                 | 3           | ...        | ...          | ...   |                                          |



| Operations.                       | Number of Cases. | Disease.                                          | Result.     |            |              |       | Remarks.        |
|-----------------------------------|------------------|---------------------------------------------------|-------------|------------|--------------|-------|-----------------|
|                                   |                  |                                                   | Successful. | Otherwise. | In Hospital. | Died. |                 |
| Tumours.                          |                  |                                                   |             |            |              |       |                 |
| Removal of ... ..                 | 1                | Fibrous, on chin ... ..                           | 1           | ...        | ...          | ...   | See Case No. 6. |
| Ditto ... ..                      | 1                | Parotid, left side ... ..                         | 1           | ...        | ...          | ...   |                 |
| By Coxeter's aspirator ... ..     | 1                | Bloody tumour, right lumbar region.               | 1           | ...        | ...          | ...   |                 |
| Ditto ... ..                      | 1                | Left scapula ... ..                               | 1           | ...        | ...          | ...   |                 |
| By Dieulafoy's ... ..             | 1                | Left arm ... ..                                   | 1           | ...        | ...          | ...   |                 |
| On the eye ... ..                 | 1                | For ectropion ... ..                              | 1           | ...        | ...          | ...   |                 |
| Ditto ... ..                      | 1                | Removal of lead ... ..                            | 1           | ...        | ...          | ...   |                 |
| On the Ear.                       |                  |                                                   |             |            |              |       |                 |
| Removal of polypus ... ..         | 1                | Polypus, right ear... ..                          | 1           | ...        | ...          | ...   |                 |
| Miscellaneous.                    |                  |                                                   |             |            |              |       |                 |
| Removal of foreign bodies ... ..  | 1                | Gunshot wound, left thigh, lodgement of missile   | 1           | ...        | ...          | ...   | See Case No. 7. |
| Ditto ... ..                      | 1                | Right thigh, supposed fracture from gunshot wound | 1           | ...        | ...          | ...   | See Case No. 8. |
| Forcibly breaking down adhesions. | 1                | Gunshot wound, right arm, with deformity          | 1           | ...        | 1            | ...   |                 |
| Ditto ... ..                      | 1                | Arthritis, left elbow ... ..                      | 1           | ...        | 1            | ...   |                 |
| Skin grafting ... ..              | 4                | Gunshot wound of face ... ..                      | 1           | 3          | ...          | ...   | See Case No. 9. |

*Case 1.—Amputation of the Foot for Disease of the Ankle Joint by Parry's Modification of Syme's—Death from Acute Tuberculosis.*

J. J., of the Royal Artillery, aged 23; a delicate-looking man, who had enjoyed fair health during his service of three years. One of his sisters died from phthisis, otherwise he had a good family history.

Admitted into Netley Hospital from Malta, on the 2nd of February, 1876, with the following history:—On the 18th of August, 1875, was assisting in drawing a handcart filled with iron shells, when his left foot turned suddenly in under him. At the time he suffered but little pain, and there was no reason to suppose anything had given way; however, the following day the ankle had become swollen, black, and painful, and he was admitted into hospital, being quite helpless, where he remained under treatment without benefit till he was sent home in January, 1876.

On arrival at Netley, his general health was fair, appetite good, and slept well. He was subject to occasional flushings of the face in the evenings; his temperature and pulse being at the same time somewhat above normal, but he had no hectic or night sweats.

The left foot, ankle, and lower part of the leg were much swollen and infiltrated, and about the ankle itself was a good deal of inflammatory redness; two openings existed at the back of the joint, giving exit to a discharge of an oily fluid mixed with sanious pus; on the introduction of a probe into either of them it could be passed freely in several directions, but without coming on bone; another opening was then made on the point of the probe passed under the skin, close to the internal malleolus, and through this, bare

and di-eased bone was at once reached and there was a sinus extending across the joint. There being no other alternative but amputation of the foot, I performed Parry's modification of Symes' operation on the 14th of February. The bloodless method was adopted, which was followed by considerable oozing of blood and a great quantity of serum from infiltrated tissues.

The wound healed slowly, the patient being very weak; his temperature kept high, rising every evening.

On the 2nd of April the discharge had lessened very much, and the stump had acquired a very symmetrical shape; soon after this he was carried into the open air, the weather being fine. He seemed to progress favourably, complaining only of a slight pain in the back and some headache; both quickly disappeared, but returned again in a few days.

On the morning of the 14th of April he suddenly became very faint, changed colour, and turned almost black in the face; he was immediately placed in bed and lay in a very lethargic state for some hours. At 6 p.m. he had considerably improved, but had some return of the symptoms about 9. On the 15th and 16th he remained much the same, the temperature on the last day rising to 101°·6.

On the 17th he appeared much better, but towards the evening he relapsed into almost complete insensibility, from which he could be roused with much difficulty to answer questions and take the necessary stimulants. His speech seemed to be affected as it was very indistinct. During the day he passed his stools and urine involuntarily.

This state continued on the following day, when it was noticed that the stump appeared shrivelled and of a brawny unhealthy appearance. The discharge had almost completely stopped, and he complained of pain in the right knee.

On the 19th, the respirations became very hurried (35 in the minute); on auscultation loud rales were heard everywhere over the chest; the heart sounds were healthy. He had no cough. His urine had to be drawn off twice in the day. He continued for some days generally better in the morning, but becoming worse in the evening. The respiration continued hurried. There was some little cough but no expectoration. He was in so helpless a state that his nourishment had to be given by means of enemata. Profuse sweating set in at night, and the discharge from the stump became very offensive.

On the morning of the 23rd he appeared more intelligent, but very weak. Pulse 104, and intermittent at about every fourth beat; temperature 102°·2. The discharge from the stump was extremely offensive. There was noticed some drooping of the left eyelid; the pupils were dilated but regular. At about 10 o'clock that evening he became bathed in a copious perspiration; pulse so quick and weak that it could not be counted. Temperature 104°·4, and he was quite insensible. This state continued till about 4 o'clock next morning, when he became much worse, and at 5.30 expired.

#### *Operation described.*

Symes' amputation modified (by Deputy Inspector-General of Hospitals Parry, late A. M. D.).

Right foot—

Assistant holds leg on level with operator's chest.

Invert foot.

Insert knife in front of border of tendo Achilles,  $\frac{1}{4}$  inch above its insertion; carry incision around the outer malleolus,  $\frac{1}{4}$  inch below its extremity, across instep to inner and upper border of the protuberance of the navicular bone.

Continue incision obliquely across plantar aspect of foot, down to the bone, in front of the pad of the heel, and round its outer border, and so connect it with the first point of incision.

See that all the tissues are divided to the bone.

The operator takes hold of heel flap by its outer aspect, dissects it back, divides the tendo Achilles close to its insertion, and so uncover the whole calcaneum.

The operator next dissects away the inner portion of the flap, keeping the edge of the knife close to the bone. This should be done by repeated short

careful incisions, so that the posterior tibial or other vessels may be left in the soft tissues of the flap untouched.

When the upper edge of the internal malleolus is reached the joint is opened, and the foot disarticulated.

Left foot—

Reverse order of incision.

Commence at protuberance of scaphoid and proceed to edge of tendo Achilles for first incision.

From scaphoid beneath the plantar surface of the foot to the same point for the second incision.

The rest as with the right foot.

#### *Condition of Bones of Foot.*

The entire cartilage over the lower end of tibia and fibula, including the joint between the two bones, is completely removed, a soft pulpy tissue covering the otherwise carious surfaces. This pulpy membrane is more extensive over the end of fibula. The disease does not appear to extend to any degree into the substances of the bones.

The superior articular facet of the astragalus, as well as the posterior calcaneo-astragaloid joint, is in the same condition as regards the removal of cartilage and substitution of it by the pulpy membrane.

The under surface of the tuberosity of the calcis, for the space of a two-shilling piece, is carious, but the caries does not extend deeply.

The disease appears limited to the above-mentioned region of the foot and ankle.

#### *Post-mortem appearances.*

The body, which had a general paleness of surface, was well nourished; cadaveric rigidity well marked.

On opening the calvarium no abnormal appearances were discovered; there was great congestion of the pia mater and large amount of cerebro-spinal fluid.

There was a lymphic exudation at the base of the brain, matting together the various nerves and blood-vessels; on separating the surfaces, sago-grain like granulations were brought into view. Clear fluid in the ventricles, with softening of commissural surface and well marked softening on central ganglia. There was no clot observed.

On opening the chest yellow purulent exudation observed in left sterno-clavicular articulation. The lungs did not collapse on opening into the pleural cavity. The pleural cavity of the right lung was thickened considerably, and studded with minute tubercular deposits. The left pleura not thickened. The right lung was much less crepitant than left, but both on section showed no uniform infiltration of milary deposit. The heart was generally soft and flabby, the various valves were all competent.

The aorta presented no signs of disease.

The position of the abdominal viscera was normal. There was a tubercular exudation in localized patches upon the peritoneum covering the liver, which was normal as to shape. Minute tubercular deposits, similar to those in the lungs, studded the capsule. On section it was firm and fatty, with slight interlobular congestion. No deposit in the substance was detected.

The left kidney was somewhat larger than the right. The capsule was easily separated, showing a congested surface beneath; on section there were tubercular deposits seen scattered here and there, more numerous and somewhat larger in the right than in the left. Some were in a much more advanced state of softening than others.

The spleen presented no signs of any deposit to the naked eye, some, however, were discernible with the aid of a lens.

There was considerable gastric and intestinal congestion, and commencement of tubercular ulceration in the jejunum, Peyer's patches showed marked indications of increased vascularity. They were dark in colour with white deposits, no doubt of a similar nature to those elsewhere found. On the peritoneal surface also there was some tubercular deposit.

On examining the stump there was found considerable thickening of the periosteum and surrounding textures, and a considerable deposit of tubercle in

the thick dense tissues composing the cicatrix. The anterior edge of the bone was rough with a general thickening and condensation of bone texture; accompanying this there was great vascularity, but no evidence of scrofulous deposit.

### *Two Cases of Excision of the Elbow Joint.*

*Case No. 2.*—T. W., a delicate looking lad, 15 years of age, belonging to the Duke of York's School.

Family history of phthisis, his father and an uncle having died of that disease.

In March, 1875, he had a sharp attack of rheumatism which affected the elbow and knee joints, confining him to bed for two months; at the end of which period the swelling of the joints had subsided, with the exception of the left elbow which remained swollen and painful.

In August, he was received into Netley Hospital for change of climate, his general health being impaired. The left elbow was uniformly enlarged, but there was no bulging of the synovial sac. There was slight pain in the head of the radius increased by rotating the hand. The forearm was slightly flexed, and the elbow one inch larger in circumference than the right.

His general health improved, but in October the opening of a sinus appeared on the inner aspect of the arm, about one and a half inches above the condyle, through which a probe could detect exposed bone; there was, however, no decided evidence as to the exposed bone being connected with the joint, and he was treated with tonics and nourishing diet, the joint being kept at rest, with a hope that the diseased bone might be thrown off.

There was very little change till the beginning of December, when the elbow became much enlarged, and, as compared with the sound one, was three inches larger in circumference. The skin over it had become pale and mottled, and cutaneous veins enlarged, but there was no great amount of pain.

On the 3rd of December he accidentally struck his elbow against a table, which set up active inflammation, and early in January, 1876, when all inflammatory symptoms had subsided, it became apparent that the joint was so extensively diseased that excision would be necessary.

On the 10th of January I excised the joint by the longitudinal incision, the limb being rendered bloodless with Esmarch's bandage, and the patient being under the influence of ether.

After the operation the limb was placed in a straight position on a firm pillow; no vessels were tied, and there was very little hæmorrhage.

On the 11th the lad was directed to flex his fingers, which he did with some difficulty but without pain; on the 15th of January, or fifth day after the operation, he flexed his fingers with ease, which were perfect in sensibility, and slight passive exercise of the forearm was commenced, so as to secure pronation and supination as well as flexion of the elbow joint.

These exercises were practised daily till the 8th of February, when he commenced the use of a 1lb. weight, suspended by a cord over a pulley, which he worked by a little help from the good arm.

His general health gradually improved, and on the 1st of March the wound of operation had quite healed, and the arm was daily becoming stronger.

On the 3rd of June he was discharged from hospital, being a few days less than five months since the operation. He could then perform the following motions: scrub and sweep the floor, lift a considerable weight, place his hand behind his back so as to button his trowsers, supinate or pronate the hand, extend the forearm, brush his hair, and feed himself with a fork. The motions of the shoulder joint were perfect as well as that of the wrist, hand and fingers. The sensation in the limb was similar to that in the sound one, and he possessed in every respect a useful limb, which would enable him to earn a livelihood.

*Case No. 3.*—Sapper G. S. in the Royal Engineers, 28 years of age, of healthy appearance with a good family history. In 1868, he struck his left elbow whilst mowing, after which it became swollen and painful; this passed off, but in 1870, when quartered in Bermuda, it again became affected, but

after suitable treatment the disease disappeared. In 1875, when quartered at Gibraltar, he again hurt it, since which time he was unable to use it, the joint having become swollen and painful on pressure. He was invalided to England, and arrived at Netley Hospital last December, when the joint was found much swollen and painful, but no symptoms to denote disease of the cartilages or bone were observed.

In April, 1876, suppuration set in, and several abscesses formed, which were opened in front of the joint. His health now became much impaired, and it was found, on examination, that the joint was implicated.

On the 2nd of May, I excised the joint by the longitudinal incision, the limb being rendered bloodless with Esmarch's bandage. The operation was followed by considerable oozing, necessitating the opening of the wound.

The day after the operation, movement of the fingers was commenced.

On the 7th of May, or fifth day after the operation, pronation and supination were commenced, and on the 12th, flexion and extension of the forearm.

On the 31st of May he used a 11b. weight, suspended over a pulley, which was increased up to 4lbs. on June 15th.

By the 14th of July the wound of operation had completely healed, and feeling strong and well he attempted mowing, and cut down one hundred yards of grass, which, he says, he performed with little inconvenience.

With the exception of flexion of the forearm, all the motions of the limb are perfect, but in this he is daily improving, being able to feed himself with a fork and brush his hair; he can also button his trowsers, place his hand behind his back, and lift considerable weights.

In case No. 2 there was gelatinous disease of the joint, with caries of all bones.

In case No. 3 there was pulpy disease of the joint, and extensive caries of the humerus and ulna.

The amount of bone removed in both cases was about two inches.

#### *Case 4.—Excision of the Head of the Right Femur.*

The patient, an officer in the Royal Scots, aged 40; during the Crimean campaign he experienced great exposure, and on one occasion, after sleeping on damp ground, incipient disease of the right hip joint became apparent. From these symptoms he appears to have been relieved, but subsequently superficial necrosis of the upper third of the shaft of the femur set in, and a considerable portion of exfoliated bone was removed, leaving a large cicatrix on the outside of the thigh. He returned to his duties, served in China, the Mediterranean, and India till 1875, when in the latter command, after great exertion he became incapacitated for duty on account of lameness and intense pain in the hip joint. He was then invalided to Netley Hospital, where he arrived in August, in a most distressing and helpless condition, having suffered great inconvenience and torture during the homeward journey.

Perfect rest was now enforced, under which he greatly improved, but in March, 1876, after a severe rigor, a large abscess formed in the neighbourhood of the joint, behind the great trochanter; on this being evacuated, and the finger passed into its cavity, the head of the femur was found perfectly denuded of cartilage and resting on the dorsum ilii, having become dislocated from the acetabulum.

Excision of the head of the bone being the only prospect for saving his life, as the soft parts had become extensively infiltrated, hectic had developed itself, and his stomach was uncontrollably irritable, it was decided to perform that operation. This I did on the 30th of March by a vertical incision, about nine inches in length, behind the great trochanter.

There was no difficulty experienced in removing the head of the bone, neck and great trochanter, the lesser trochanter being left untouched, with the insertions of the psoas and iliacus muscles intact.

The operation having been completed, I applied to the opposite thigh the socket of Sir William Fergusson for enforcing counter extension, but on

attempting to arrange the bracket-splint of Mr. Erichsen, I found it impossible, as the knee joint had been so long flexed it had become fixed, and the straight splint could not be applied. This method of extension and counter extension had therefore to be abandoned.

The patient, already very weak, was now almost completely exhausted, in fact but little vitality remained, and for several hours it was doubtful if he would ever rally; with a view, therefore, of leaving him at perfect rest and try and restore nature, I placed the limb on M'Intyre's double inclined plane, well padded, in which it remained for two days.

On the third day he had fairly rallied, but expressed himself as feeling most uncomfortable, due to the arrangement of the bed, which consisted of two hair mattresses, on the top of which was placed a stretcher, the canvas of which was divided into five portions, the three centre ones being attached to the side poles by means of straps and buckles, so that one of them might be removed for the purpose of dressing the wound or using the bed-pan.

To relieve his discomfort, which he said consisted of a feeling as if he rested on the back of his head, left buttock and heel, I raised the stretcher, removed top mattress and replaced it by one consisting of three portions, the centre one of which had a hole ten inches in diameter cut in its centre.

The stretcher being replaced, his buttock fitted into this hole and removed all pressure from his back, on which a large bed sore had formed during the two days of his great prostration. The comfort of this arrangement was indescribable, but then came the question of extension of the limb; this I effected by a weight attached to the foot and suspended over a pulley adapted to an upright fixed in the floor at the end of the bed. The limb was supported on either side by sand bags, and the buttocks fitting into the hole in the mattress formed as it were the point for counter extension.

From this time forward he steadily improved. By means of the stretcher he was raised from the bed, the wound dressed as well as the bed sore, sheets re-arranged and the necessary utensils made use of.

On the 1st of May extension was removed and the limb simply supported by sand bags; on the 21st of May he was able to move the limb slightly; on the 10th of July the stretcher was shifted from under him for the first time, and with a little help he turned both legs out of bed.

On the 26th July he commenced to walk with crutches, in which he daily improved. The wound healed most steadily from the bottom, being simply dressed with carbolized oil.

His convalescence was retarded by the old wound reopening in consequence, no doubt, of a piece of bone being set free.

The limb, nine months after the operation, is about  $2\frac{1}{2}$  inches shorter than the sound one, but this great difference is in consequence of the knee being still slightly flexed.

There is no pain in or about the seat of operation, and when he stands erect he can lateralise and rotate the limb for several inches.

During the course of treatment he complained greatly of pain on the inside of the knee, which was relieved when extension was being applied, by taking care that it was in the axis of the leg and not forcing the limb, as it were, into straight position; subsequently fomentations and anodyne liniments relieved it.

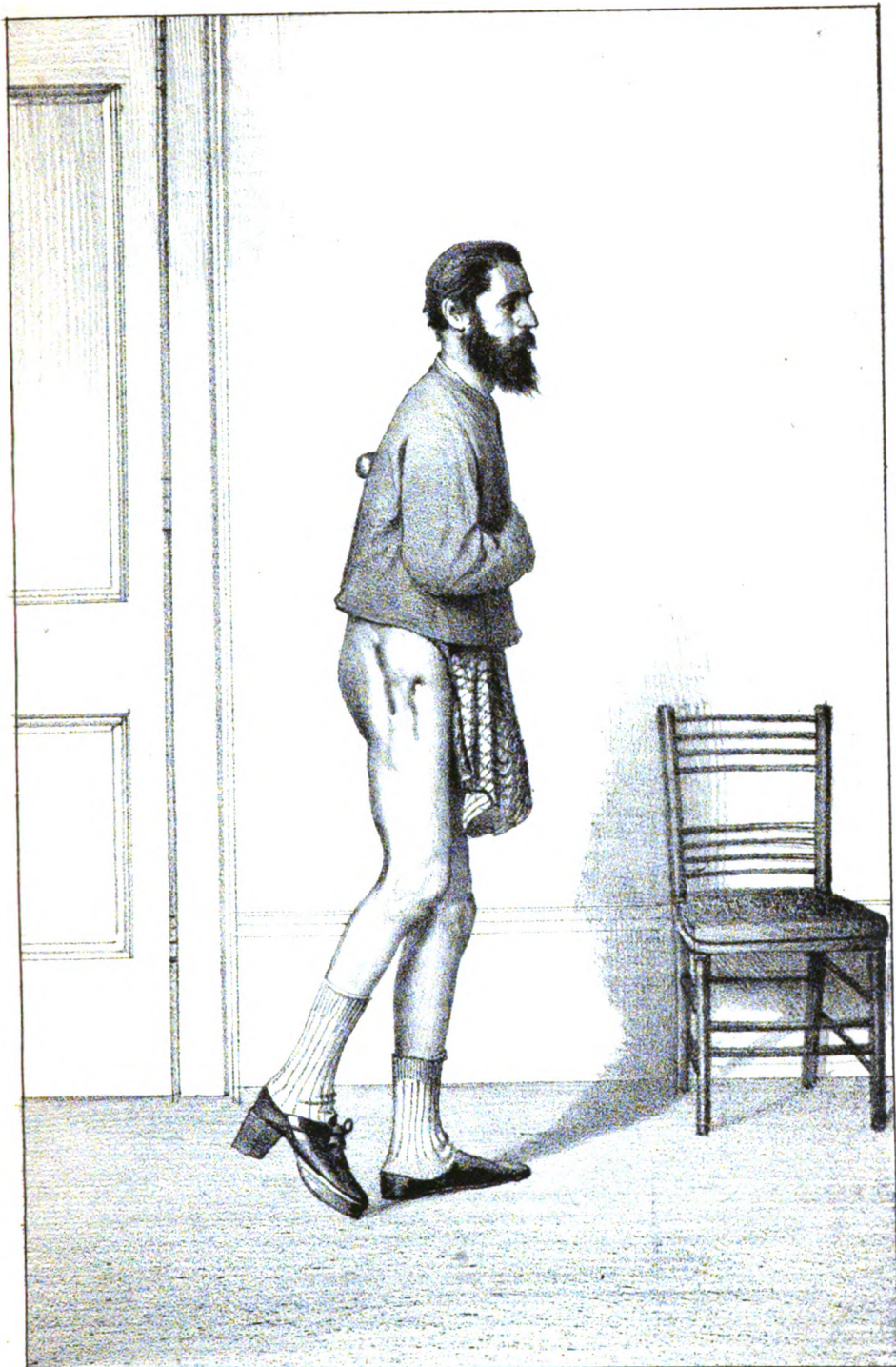
See accompanying illustration.

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*Case No. 5.—Impermeable Stricture of the Urethra, accompanied by Perineal and Scrotal Fistula—Extravasation of Urine—Puncture of the Bladder per Rectum—Successful Dilatation of the Urethra—Recovery.*

The subject of this interesting case was Corporal J. W., of the 5th Fusiliers, a delicate-looking man, who had served ten years in India. Had suffered twice from gonorrhœa, which was treated with strong injections, and once from a venereal sore. His habits have been intemperate.

In June, 1863, he first noticed a diminution of the stream of urine, with a difficulty in micturition, which act was followed by dribbling of urine. For



Dangerfield, 22 Bedford St. Covent Garden.

CASE OF EXCISION OF THE HEAD OF THE FEMUR NINE MONTHS AFTER THE OPERATION,  
WHEN THE PATIENT WAS ABLE TO WALK UP & DOWN STAIRS WITH THE AID OF A CRUTCH.  
THE ILLUSTRATION REPRESENTS THE WOUND OF OPERATION & THE POWER THE PATIENT POSSESSES  
IN BEING ABLE TO PLACE HIS FOOT BEHIND HIM.





this he was treated by dilatation, and returned to his duty apparently quite well.

In 1871, symptoms of stricture again returned, and he was treated by dilatation in the hospital at Murree, where there appears to have been a great difficulty in introducing an instrument.

In 1874, when quartered at Bareilly, he had retention of urine: and again, in April, 1875, when no instrument could be introduced into the bladder *per urethram*, and it was found necessary to relieve him by puncturing the bladder above the pubes, his symptoms of stricture were now somewhat relieved; but an abscess formed in the left side of the scrotum, which was opened, and through which urine escaped.

In September, 1875, an abscess formed in the right buttock, near the anus; this was also opened, and was followed, in about a week, by a free flow of urine. In October another abscess formed in the left buttock, which resulted in a fistula, through which urine flowed, whenever he attempted to micturate or defecate; in fact, he was unable to void his urine without regularly going through the act of defecation.

On arrival at Netley Hospital, on the 25th of April, 1876, he was in a most wretched condition; countenance pale and anxious, indicative of great distress. His nights were sleepless, being constantly disturbed by the irritation of the urine trickling from the bladder, rendering his clothes offensive, and producing great constitutional disturbance, his pulse being quick, tongue dry, with exacerbation of fever towards evening, ushered in by bilious vomiting and rigors. There was a hard callous stricture  $5\frac{1}{2}$  inches from the external meatus, extending backwards for a considerable distance, rendering the urethra hard and penis infiltrated.

The left testicle was enlarged, and in the skin covering it was an opening, surrounded by pale fleshy granulations, from which a cylindrical band of thickened tissue could be traced up to the urethra, entering it about the bulbous portion. From 1 to  $1\frac{1}{2}$  inches on either side of the anus there were two fistulous openings, surrounded by large granulations; both these openings discharged a large quantity of pus, and urine escaped through all three, more particularly when he strained; this compelled him always to go to the W.C. when he wanted to micturate.

From date of admission to the 8th of May, several prolonged attempts were made to pass an instrument through the stricture into the bladder, but without success; and on this latter date, his symptoms being very grave, the bladder presenting a large tumor in the lower part of the abdomen, and there being complete retention of urine, none even coming through the fistula, which, up to this, had relieved the bladder, I decided to puncture it *per rectum*, according to Mr. Cock's method.

At 10 A.M. the patient was placed under chloroform, but, having ceased to breathe, thus giving rise to great alarm for his safety to all concerned, much delay was caused in restoring animation, which, having been satisfactorily effected, the operation was proceeded with without an anæsthetic.

From some cause or another, very little urine followed the operation; he was placed in a warm bath, and a suppository, containing  $\frac{1}{4}$  of a grain of morphia administered. At 2 P.M. he had a severe rigor, with great pain in the epigastrium, and vomiting followed by high fever. At 4 P.M. diarrhœa set in, and a large quantity of urine passed with the fœces, which was followed by great relief.

On the 9th the feverish symptoms had disappeared, but the diarrhœa was very troublesome, and the urine flowed freely from the anus; he now experienced the greatest comfort from subcutaneous injection of morphia in  $\frac{1}{4}$ th of a grain doses, twice a day, which soothed him, and removed all irritation about the bladder, urethra, and anus. On the 11th a little urine passed through the urethra, with much scalding and pain, and on the 13th, No. 1 bulbous metal catheter was passed as far as the neck of the bladder, but no further.

On the 16th another attempt was made to pass No. 1 catheter, which failed; when a catgut bougie was introduced, and allowed to remain in the urethra the greater part of the day, the subcutaneous injection of morphia being steadily administered to relieve all pain and irritation.

On the 17th there was a small stream of urine through the urethra, and the hardness and infiltration along the passage had partly disappeared.

On the 18th, No. 1 French bulbous catheter was passed into the bladder, and urine drawn off; but from this date to the 3rd of June no instrument could be introduced. In the meantime inflammation had attacked the right side of the scrotum, which ran on to a gangrenous condition, having become extravasated with urine, and on the 3rd of June, his condition being precarious, all urine passing by the fistulæ already described, the wound of operation in rectum having closed, his pulse being very quick and weak, and his body exhaling a strong smell of urine. I laid the scrotum freely open, by this means setting free a quantity of pus and urine, administered bark and ammonia, and, after great difficulty, succeeded in introducing No. 2 metal catheter, which I quickly followed by No. 4, and secured it in the bladder, where I allowed it to remain till the 6th, when it was removed, and No. 6 introduced.

On the 7th, No. 8 French bulbous was introduced, but not allowed to remain, as cystitis had been set up, and he could not tolerate it; he had, however, learnt the method of passing an instrument for himself, and used one when he felt the desire to micturate.

He now steadily improved; the wound in the scrotum soon cleaned and healed, the fistulæ closed, the cystitis disappeared by daily washing out of the bladder and the administration of mineral acids.

By July 5th he was able to pass No. 12 French bulbous catheter as well as a No. 12 metal sound; no unpleasant symptom of any kind remained, and on the 28th of July he returned to his regimental dépôt, with every prospect, should he attend to instructions, of being an efficient soldier.

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*Case No. 6.—Removal of a Parotid Tumour.*

This occurred in a young patient, aged 22 who gives the following history of its appearance:—

"The first intimation I had of anything amiss was in the beginning of March, 1875, when a small hard lump became apparent to the touch in the fleshy part of the neck, just under the ear. It was then scarcely visible, and was in no way an inconvenience.

"It was considered enlargement of the parotid gland, and, from the increase in the quantity of saliva, there appeared to be no doubt as to this being the case. In November, 1875, it had increased considerably, and I was greatly troubled with shooting pains in it. Local and constitutional treatment had no effect on it, and it continued steadily increasing, causing slight numbness in the side of the face, till July, 1876, when I was recommended to have it removed."

When seen by me in the following August, there was a tumor, about the size of an orange, in the region of the right parotid gland, having a firm feel, and apparently very deep, under the ear.

Arrangements having been made for its removal, on the 28th of August, by a long vertical incision in front of the ear, I cut down on the cyst and endeavoured to work round it with my finger, but from old adhesions, due, probably, to the inflammation set up by the local irritating applications, I was unable to detach it without the aid of the scalpel.

After some difficulty the mass was removed without the necessity of securing a single vessel, but in the cavity left, the large vessels of the neck could be distinctly seen and felt.

The operation was performed under the antiseptic spray, and all precautions taken to try and secure union of the wound by the "first intention," but about three hours afterwards profuse hæmorrhage set in, and it was found necessary to open it and inject the tincture of the perchloride of iron, which had the desired effect, but which retarded its healing for a considerable period.

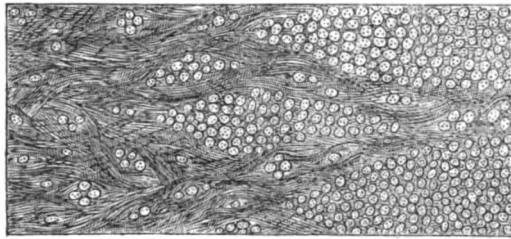
*Report on Nature of Tumour, by Surgeon-Major J. Fleming, A.M.D.*

"It is somewhat kidney shaped, distinctly lobulated on its surface, and surrounded by a strong fibrous capsule, which does not dip between the lobules. Its dimensions are as follows :

|               |     |     |                         |
|---------------|-----|-----|-------------------------|
| Length ...    | ... | ... | 1 $\frac{3}{4}$ inches. |
| Breadth ...   | ... | ... | 1 $\frac{1}{4}$ "       |
| Thickness ... | ... | ... | $\frac{3}{4}$ "         |

"On removing the capsule, the circumference of the tumor is found to be rather vascular, very soft, friable, and easily scraped away by the finger-nail, while towards the interior of the growth, the structure is of the consistence and has the physical appearance of cartilage. The tumor is made up of fibro-cellular tissue, and masses of cells chiefly composed its greater part. The cells are mostly of the same character, being ovoid or circular, containing nucleoli, and they diminish in numbers towards the centre of the growth, which, though resembling cartilage, is composed of white fibrous tissue in a state of great condensation.

"The magnified sketch underneath gives an idea of the structure, above described, from within outwards, showing, the gradual transition from the central condensed fibrous tissue towards the masses of cell structure on the right of the figure." "Judging from the vascularity of the tumor externally, and the great abundance and quality of the cell growth, it is a structure which would be liable to recur if any portion were left behind; but in the present instance the whole (as contained within the capsule) appears to have been removed in its entirety."



A Section of Parotid Tumour magnified.

*Case No. 7.—Removal of a Bullet which had been lodged for nearly Two Years and a Half.*

Major A. A. G., 103rd Regiment, was wounded on the 27th of October, 1873, when engaged with the enemy at Dungualo, Ashantee. According to the statement of his case, the missile entered the left groin, a little over an inch to the outside of the great vessels and an inch below Poupart's ligament; it passed outwards, backwards, and downwards below the great trochanter. Several attempts were made, both on the coast and at home, to discover the missile, but without success, and for nearly two years and a-half it remained lodged, giving rise to a copious discharge through the opening of a sinus at the wound of entrance, and causing impairment of health, with great inconvenience.

Having made several examinations with the different exploring instruments which have been invented from time to time, no definite conclusion was arrived at, further than the discovery of a hard substance, fully three inches deep on the outer side of the femoral artery.

Major G. having agreed to an attempt being made to remove it, on the 4th April, 1876, he was placed under the influence of ether, the opening of the sinus enlarged with a probe-pointed bistoury, and the little finger of my right hand introduced into the wound, the tip of which could just reach the missile; by a little manipulation, with the left hand pressing towards the finger, the missile was hooked by the first phalax, and by still further enlarging the wound outwards, an iron bullet, 82 grains in weight, was removed.

The wound was dressed from the bottom with lint saturated with carbolised oil, and at the end of one month it had completely healed.

No indication of metal having been given by the electric explorer, even when the bullet was out of the wound it was found to be coated with clay, which prevented contact with the poles of the explorer.

*Case No. 8.—Removal of a Bullet after being lodged for Six Months.*

W. L., of the 70th Regiment, was wounded in an engagement against the Malays, near Sunghie Wyong, on the 7th of December, 1875.

The projectile entered the inner side of the right thigh, about 6 inches above the knee. Immediately he was struck, he fell, but experienced very little pain or faintness. On attempting to rise again, he found he could not lift the injured limb, as the bone was broken. He was conveyed to camp, a distance of seven miles, where a careful search was made for the projectile, but no foreign body could be detected.

The fracture united most satisfactorily, the limb having been treated in the bent position; and, in April, 1876, he began to get about on crutches.

On arrival at Netley Hospital, the 2nd of the following June, there was a small circular depressed cicatrix (the wound of entrance),  $1\frac{1}{2}$  inch in diameter, on the inner side of the right thigh, about 4 inches above the condyle, and a little nearer the front than the back of the limb. In the centre of this cicatrix was an extremely minute opening, through which a probe could be passed into a sinus 1 inch in length, and at the end of this a hard foreign body could be felt lying in the soft tissues, and that this was the missile which caused the wound there can be no doubt.

This minute opening was enlarged in a vertical direction to the extent of about one inch and a half, the forefinger of left hand passed down to the foreign body so as to fix it, and a bullet forceps then introduced, and a block tin and porcelain bullet extracted with some trouble, it having become encysted. Weight of bullet, 141 grains.

A small piece of necrosed bone, about the size of sixpence, came away about 6 days after the operation, when the wound rapidly closed.

There is special interest attached to this case of gunshot fracture of the thigh, as, notwithstanding the patient having been carried for seven miles in a most primitive manner after he was wounded, no complications arose during the treatment which in any way retarded his recovery.

When the patient left Netley Hospital, there was considerable thickening of the lower third of the femur, and the limb was apparently shorter than the sound one.

Illustration No. 1 represents the missile in its natural size and form, which was removed from this patient, weight 141 grains, and which is composed of tin apparently hammered into a spherical form, within this metal is a piece of porcelain, a portion of which is represented by the dark spot, *p*. The object of this porcelain it is difficult to discern, as it does not add any special weight to the missile, and did not become detached on striking the bone, as might have been supposed, with a view to aggravate the wound.

Illustrations Nos. 2 and 3 also represent missiles composed of tin and porcelain, with which two men of the 10th Regiment were wounded during the same engagement. No. 2 is apparently a section of a piece of thick wire, weight 146 grains; and No. 3 is a spherical bullet, weight 171 grains, very

irregular in shape, with a small nipple-like projection, and a large portion of porcelain, *p*, appearing.



*Case No. 9.—Gunshot Wound of the Right Side of the Face, followed by total Destruction of the Eye and great Loss of Tissues—Extirpation of Lachrymal Gland—Removal of Tarsal Cartilage, and Skin grafting,*

No. 67. Private D. C., of the 74th Highlanders, on the 10th of March, 1876, after indulging too freely in alcohol, attempted to commit suicide by shooting himself with his rifle. The bullet entered his neck, about  $\frac{1}{2}$  of an inch behind the anterior margin of the right sterno-mastoid muscle, on a level with the top of the thyroid cartilage, it passed upwards, penetrating the muscles of the tongue, shattered the lower jaw on the right side, about an inch anterior to its angle, carried away the right malar bone and a portion of the floor of the right orbit, completely destroyed the soft parts on that side of the face, as also the right eye. There was a simple fracture of the frontal bone, extending backwards for about 2 inches. There was violent hæmorrhage, which appears to have been soon controlled.

The wound was dressed with cotton wool soaked with carbolic oil; very little irritative fever followed the injury, and for some time he was fed by means of the tube belonging to the stomach pump; several sloughs and pieces of bone came away, after which the wound healed, with the exception of a sinus communicating with the mouth at its right angle, and a large triangular granulating surface extending from the orbit to the angle of the mouth, and from the side of the nose outwards to the prominence of the cheek.

On arrival at Netley his general health was very good, but the granulating surface and sinus, as above described, still existed. The right upper eyelid was perfect, and its hairs, which rested on the granulating surface, kept up a constant state of irritation and purulent discharge, which trickled through the sinus into the mouth. The lachrymal gland protruded from under the outer angle of the eyelid, and gave rise to much irritation on the outer half of the wound from the contact of tears which trickled into the mouth through the sinus at its outer angle, and on that portion of the wound, when these tears were shed, its surface had all the characters of mucous membrane.

With a view to relieve the patient from this most uncomfortable condition, I at first contemplated a plastic operation, by taking some healthy skin from the cheek, but afterwards decided to try skin grafting, and accordingly, on the 11th of October, 1876, grafted three pieces of skin taken from over the right deltoid muscle.

On examining the wound three days after the operation, I found the grafts had been washed away by the discharge and tears. I then decided to try the operation again under different conditions, and on the 18th of October, the patient being under the influence of chloroform, first removed the tarsal cartilage of the upper eyelid, by which the irritation from the hairs was at once obviated. The mucous membrane lining the orbit and lid was then dissected off, and with it the lachrymal gland extirpated. The granulating surface was freely scored with a scalpel, and three pieces of skin taken from over the deltoid muscle engrafted.

The surface of the wound was then dressed with carbolic oil, 1 in 40, and the whole secured with a pad of cotton wool and bandage.

On the third day it was found two of the skin grafts had taken, and that all flow of tears and pus from the wound into the mouth had ceased. On three subsequent occasions skin grafts were again tried, but without success; however, those which had taken increased in circumference, the wound gradually contracted, and is now in a fair way for being completely skinned over, the application of salicylic acid assisting this process in a great measure.

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*Remarks on Cases of Stricture of the Urethra.*

During the year 1876, 33 cases of stricture of the urethra were treated in Netley Hospital, all of which were admitted from foreign stations. Of these 27 had their origin in gonorrhœa; 3 in gonorrhœa and injury combined; 1 in local injury; and in 2 the patients could not account in any way for the disease.

Most of the cases had strong injections for the treatment of the gonorrhœa, which disease in many instances became gleet, extending over considerable periods, the urethra gradually becoming contracted.

In 2 cases there were fistula in perineo, and in 1 chronic orchitis, which complications disappeared as the strictures were cured.

Of the position of the 33 strictures, 1 was at the external meatus; 3 within  $1\frac{1}{2}$  inches, 3 within  $2\frac{1}{2}$  inches, 5 within  $3\frac{1}{2}$  inches, 2 within 5 inches, 13 within  $5\frac{1}{2}$  inches, 7 within  $6\frac{1}{2}$  inches, and 2 within  $7\frac{1}{2}$  inches, of the external meatus; 2 were noted as being at the neck of the bladder; making a total of 38 strictures in 33 cases, 5 therefore had 2 strictures each.

*Treatment.*—In 31 cases gradual dilatation with metal or elastic instruments was carried out with marked success; 2 cases were treated with Mr. Holt's forcible dilator and dilatation after the operation with metal and elastic instruments, both being successful.

In 1 case division of a stricture at the external meatus was found necessary, pain and distress in micturating being at once relieved.

In 1 case there was complete retention of urine, from a hard, firm, permanent stricture in the penile portion of the urethra. Puncture of the bladder was performed per rectum, which was followed by relief and cure of stricture. See Case No. 5.

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## APPENDIX No. III.

REPORT ON THE ADMINISTRATION OF CHLOROFORM AND  
ETHER AS ANÆSTHETICS.

By Surgeon-Major PORTER, Assistant Professor of Military Surgery.

DURING the year 1876 chloroform and ether were administered at Netley Hospital in 21 and 13 cases respectively.

The following is an analysis of the time taken to place the patients under their influence, the quantity used, and their general effects, as taken from a register kept for that purpose:—

*Chloroform.*

|                                              | Minutes. | Seconds. |
|----------------------------------------------|----------|----------|
| Shortest time taken to place under influence | 2        | 0        |
| Longest time                                 | 20       | 0        |
| Average time                                 | 8        | 5        |
| Average time under influence                 | 11       | 20       |
| Smallest quantity used in any one case       | 1        | drachm   |
| Largest quantity used                        | 12       | drachms  |
| Average                                      | 3        | 9        |

Vomiting occurred in 2 cases during or after the administration of the drug.

Excitement in 11 cases during or after the administration of the drug.

In 2 cases there were most grave and alarming symptoms, sudden failure of the pulse, lividity of countenance, and feeble respiration, obliging the operator to discontinue the anæsthetic and restore suspended animation, by pulling the tongue forward, using artificial respiration, and allowing a free current of fresh air to pass over the body.

*Ether*

|                                              | Minutes. | Seconds. |
|----------------------------------------------|----------|----------|
| Shortest time taken to place under influence | 7        | 0        |
| Longest time                                 | 45       | 0        |
| Average time                                 | 18       | 0        |
| Average time under influence                 | 17       | 41       |
| Smallest quantity used in any one case       | 2½       | oz.      |
| Largest quantity used in any one case        | 14       | „        |
| Average                                      | 6½       | „        |

Vomiting occurred in 4 cases during or after the administration of the drug.

Excitement occurred in 10 cases during or after the administration of the drug.

The anæsthetics were invariably administered on empty stomach.—Chloroform by means of a handkerchief or towel folded into the form of a cone, or sprinkled on thin flannel stretched on a wire frame.—The ether, with one exception, was given with Dr. Thomas Skinner's apparatus—"Punch's Nose," as described in the *British Medical Journal* of October 2, 1875, page 243. It is certainly more tedious than Morgan's apparatus, and wasteful, but has the advantage of being more portable.

## APPENDIX No. IV.

## ON THE DIAGNOSIS AND CAUSATION OF FÆCO-MALARIAL FEVER.

By Surgeon-Major JAS. Y. DONALDSON, M.D.

SOME confusion having arisen as to what constitutes Malta, or, as I prefer to call it, Fæco-malarial, or Mediterranean fever (for it exists in Gibraltar as well as in Malta), the following remarks are intended to throw some light upon the subject. By fæco-malarial fever, I mean what has been called by Marston and others, "gastric remittent fever," which I think better deserves the name of Malta fever than the febricula common to other warm countries, which is generally recognised by that name. I think the designation suggested by Professor Maclean a bad one—typho-malarial fever—as it is compounded of a cause and a result. By the word "*malaria*" I mean all noxious exhalations from the soil, or buildings thereon, capable of generating disease, and by "fæco-malaria," noxious exhalations from decomposing sewage or fæcal matter. I shall speak of malaria in the sense Professor Maclean uses the word, as marsh malaria, or miasma.

The febrile conditions requiring to be distinguished in Malta, are commonly the following, viz., (1) febricula, including simple continued fever; (2) febrile dyspepsia; (3) fæco-malarial fever; (4) enteric fever.

When a soldier reports himself sick with febrile symptoms, the following questions are put to him:—How long have you been ill? Was your appetite good up to the day on which the shivering, headache, or pains in the "bones," commenced, or had you been losing it for some days previously? If he had been ill only for a day or two, and had had a good appetite up to the commencement of the rigor, &c., the disease would most likely be febricula (including simple continued fever), if, on the contrary, he cannot well tell when he first began to feel out of sorts, but states he has been able to take but little food for some days, and has had occasional headache and feeling of chilliness, then in all probability the disease will turn out to be, in the summer or early autumn, either febrile dyspepsia or fæco-malarial fever, or, later in the autumn, enteric fever.

The latter may occur earlier in the season, or indeed any time throughout the year, although most common in the autumn.

The diagnosis betwixt fæco-malarial and enteric fever, which of the above named diseases resemble each other most, is further made, as follows, viz:—

*Enteric Fever.*

General aspect depressed, as if suffering from the effects of a poison.

Characteristic eruption on skin.

Diarrhœa.

Temperature following a definite course.

One exacerbation and remission in twenty-four hours.

Bronchitis common.

Delirium common.

A signal loss of strength early in the disease.

No such periods.

Relapses not common.

*Fæco-Malarial Fever.*

General aspect natural.

No eruption on skin.

Constipation.

Temperature very irregular.

One, two, or three paroxysms and remissions during twenty-four hours.

Bronchitis rare.

Delirium rare.

Strength not so much impaired as might be expected.

In latter stages, periods of complete freedom from fever.

Very liable to relapses.



*Enteric Fever.*

Rheumatic and neuralgic sequelæ not common.

Mortality about 25 per cent.

Post-mortem appearances : enlargement or ulceration of Peyer's glands, or solitary glands of large intestine, or both.

The above diagnosis is generally applicable, although cases occur, chiefly in the autumn, where it is impossible to tell which of the above diseases you have before you, and a post-mortem examination alone can settle the point ; these "mixed cases" will be alluded to again under the head of "Causation."

*Febrile dyspepsia* is distinguished from either of the above, at whatever season of the year it may occur, by the pyrexia being intermittent and the paroxysms very irregular in their onset, intensity, and duration, from the very beginning of the disease, and it is almost always attended with marked depression of spirits, amounting in some cases almost to melancholia.

*Febricula* is chiefly recognised by the history of the onset, as above noted, and by its ending in a very few days by crisis.

The name *simple continued fever* is applied to cases of febricula lasting more than three or four days, although some medical officers at this station apply that term to what has been called in this article *fæco-malarial fever*.

A few remarks may be made on some of the above diagnostic symptoms.

I. *General expression of Patient.*—On entering a ward where both enteric and fæco-malarial fever cases are being treated, it is, as a rule, easy to tell which is which by the expression of the countenance alone. The face of a patient with fæco-malarial fever may have an anæmic or flushed appearance, according as to whether he is seen in the exacerbation or remission, but the expression is, otherwise, as in health ; that of the enteric fever patient wears a look of one suffering from serious disease ; I have called it a poisoned expression.

II. *Diarrhœa and Constipation.*—In fæco-malarial fever there is almost always constipation ; the reverse obtains in the cases of soldiers of intemperate habits who have had diarrhœa, or a tendency to diarrhœa, before being attacked with the disease.

III. *Temperature.*—In fæco-malarial fever it is very irregular, on account of there being often more than one exacerbation and remission during the twenty-four hours. Records of temperature taken only twice daily are hence of little use in this disease.

IV. *Exacerbations and Remissions.*—These are evident in all cases of fæco-malarial fever from the beginning of the disease, and are not to be confounded with the evening exacerbations and morning remissions of enteric or other fevers. The exacerbations in the first noticed disease may occur during any part of the twenty-four hours, and their onset is generally marked by an evident increase of headache, chilliness, or rigors ; I have seen the rigors as well marked as in ague, and lasting for hours. The remissions and exacerbations become better marked as the disease advances, and often in the latter stages the fever becomes an irregular intermittent.

V. *Delirium* in fæco-malarial fever is rare ; when it happens it generally indicates a complication.

VI. *Loss of Strength.*—There is often but little loss of strength, even in long-continued cases of fæco-malarial fever ; indeed some of the cases do not come into hospital at all during the febrile stage, but report themselves sick when neuralgia, effusion into one of the joints (generally the knee), or some other painful sequelæ occurs.

VII. *Post-mortem Appearances.*—The pathognomonic lesion of fæco malarial fever is hyperæmia of the mucous membrane of the duodenum and upper part of the jejunum, always well marked and often intense ; softening of the mucous membrane of above parts may or may not be present. This hyperæmia may appear in other parts of the mucous membrane of the alimentary canal, but its existence there is not constant. All cases where there is enlargement or ulceration of Peyer's glands, or of the solitary glands of the large intestine, must be looked upon as belonging to enteric fever. Fatal cases occur where

both the above sets of post-mortem appearances occur together; these are mixed cases and during life the symptoms will be found partaking both of fæco-malarial and enteric fevers. Cases of undoubted enteric fever occur at this station, where the only lesion in the alimentary canal found after death is in the solitary glands of the large intestine.

The fevers above enumerated are subject to modifications—the so-called “bilious fevers.” These seem to me to be but explosive forms of those already mentioned; that is, cases where the force of the disease, in place of being spread over weeks or months, as is usually the case, expends itself in a few days, and not new diseases.

#### *Causation.*

I look upon enteric and fæco-malarial fever and febrile dyspepsia as but different expressions of a similar cause, viz., the breathing of an air or the drinking of a water polluted by sewage or its emanations; the former being due to the introduction of the poison through the drinking water, and the two latter to its entrance through the air. An examination in detail of some points in connection with the air, water, and soil of Malta, as they influence the soldier, may serve to elucidate the above statements.

*Air.*—The pollution of the air of the streets, and in a much more marked degree of the interior of the houses of the “Three Cities,” in or near which most of the barracks of the island are situated, is very apparent, even to the casual observer. This results almost wholly from the emanations from sewers: the primitive waterclosets in most Maltese houses and the numerous gratings in the streets being but so many ventilators for the very faulty sewage system with which they are connected. Dr. G. Gulia, an eminent local practitioner, states, that in Cospicua “effluvia arising from houses and sewers are so intense that silver articles left exposed in houses blacken in a short time.” (Il. Barth, 6th March, 1875.) In the highest part of Cospicua is situated a barrack, noted for its fever epidemics, chiefly fæco-malarial, viz. Verdala. The rooms are casemates, built round a narrow irregular space, shut in on all sides. The drainage of Verdala barracks is connected with that of Cospicua, and the outlets within the barracks enclosure act as ventilators for the sewage system of the above-named most insanitary town. It may be said that the outlets of the drains within Verdala are trapped; this is allowed, but the traps are water ones, and the pressure on the sewage gas at the highest part of Cospicua—which is very evident in summer outside the barracks at places where there are only open gratings—easily forces them. Even although there were little or no pressure, the sewage gas soon saturates the water in the traps, and when this takes place effluvia is constantly given off from its surface, and the warmer the weather the more the gas disengaged. At the season of the year when the fæco-malarial fever occurs, the water supply of the barracks in question, although in part medically unsafe, is chemically usable, and in the part which is suspicious the deleterious matter may be supposed to exist in so diluted a state from the winter’s rains as to be incapable of producing disease. The barracks are situated on porous sandy limestone, the surface drainage is good, and the soil is not contaminated. The soldier also spends his leisure in the various insanitary towns, and seldom goes out into the country, so that when he is not inhaling the fæco-malaria in his own barracks he is being poisoned with it otherwise, often in a more concentrated form. Hence it would appear that the only potent cause in operation at the season of the year when fæco-malarial fever is rife—the summer and early autumn—is the constant inhalation of sewage emanations. The same sort of reasoning may be applied to some of the other barracks in the Command where fæco-malarial fever occurs. To all this a plausible objection may be brought forward; it may be asked, Why does fæco-malarial fever occur in the summer and early autumn? why does it not prevail at other seasons also? (it does occur, however, at other times) since the hurtful sewage emanations are evolved for the whole warm part of the year. This may be answered by assuming that those susceptible of fæco-malarial fever have mostly all succumbed before the autumn is reached, and that by this time another set of causes have come into operation, producing a separate form of fever. The question of marsh malaria will be discussed in connection with Soil.”

*Water.*

Water is supplied from two aqueducts and from numerous tanks containing rain water, but the tanks for the use of the troops sometimes contain a mixture of both. The chief characteristics of this water are its containing lime and chlorides. Parkes (*Hygiene*, p. 592) accounts for the latter on the supposition that the spray from the sea falls on the roofs of buildings and is hence washed into the tanks. But there are many tanks which the spray cannot reach, and to which this method, therefore, cannot apply. I think it more probable that both the lime and chlorides are drawn from the strata over which the water flows; it always runs over the sandy limestone in some part of its course (its analysis is given under soil), which forms the buildings, roofs of tanks, roads, parades, and other collecting surfaces, and would naturally wash out part of the chlorides and lime which it contains. Chemically, the tank water is usable, although, from a medical point of view, it is unsafe; it is so because the collecting surfaces are subject to pollution, sometimes of the worst description. The following examples may be given: (1) The new military hospital for the Cotonera district: the collecting surfaces for the water of this building are the roofs of the hospital, kitchen, &c., the hospital grounds, a neighbouring bastion and parade ground!! (2) Verdala barracks: partly from the roofs of the buildings, partly from the ditch of the fortification where it is a common thoroughfare. (3) Fort Ricasoli, partly from aqueduct, partly from parade, &c. In some barracks, such as Pembroke Camp, where the collecting surfaces are the roofs of the buildings, the public roads and the neighbouring rocky ground, part of it is said to be filtered before reaching the tanks, that is, it is allowed to run through upright slabs of porous stone before reaching them: it thus undergoes a straining process, by which means suspended matters are in a measure removed. As the chemist cannot detect the germs of disease, there is always a suspicion that these may exist in such water as above described, from the nature of the collecting surfaces; and from the same cause also during epidemic seasons of cholera, or the like, the tanks would be subject to sudden contamination with the contagious matter of those epidemics, and thus carry destruction far and wide. How this water does not, under ordinary circumstances, produce the fever under consideration, has already been explained; that it is capable of conveying many other diseases may be allowed.

*Soil.*

The soil on which all the barracks, with one exception, are situated is composed of humus and the debris of underlying sandy limestone; its depth varies much. The exception being Pembroke Camp Barracks, where the soil is humus resting on the lower semi-crystalline limestone. The stone of which the barracks and houses are built and on which they mostly rest has been called by most authorities "sandstone." The following is its composition:—

|                              |      |      |      |         |
|------------------------------|------|------|------|---------|
| Calcium, carbonate           | .... | .... | .... | 582.41  |
| Calcium and sodium, chloride | .... | .... | .... | .59     |
| Silica                       | .... | .... | .... | 117.00  |
|                              |      |      |      | -----   |
|                              |      |      |      | 1000.00 |

It would thus be more correctly named a sandy limestone. The proportion of chlorides varies from circumstances for which no adequate reason has been assigned. It will be now clear why the water supply of Malta, which runs over or traverses the above sandy limestone in some part of its course, contains lime and chlorides, and why borings in strata of this kind with the expectation of finding fresh water should meet with failure. In 1867 a shaft was sunk through this sandy limestone in order to try and obtain an addition to the water supply of the island; at the depth of 110 feet the supply of water was 112 gallons per hour, but it was brackish and unfit for use. (The water for the Wignan court and Fauara aqueducts is derived from the upper limestone.) The drains in Malta are usually described as narrow deep channels cut in the soft porous rock, but it should also be added that the sewers are covered inside with a coating of cement, and are thus, except where the cement has given way, impervious; some of the drains conveying surface water to the

sewers are, however, without cement, and would answer to the above description. I have seen some of the oldest sewers opened and have examined their margins, and here and there a dark stain extended into the cream-coloured calcareous sandstone to a distance of about four inches where the cement had given way, but this was all; the "fecal saturation of the part of the island occupied by the troops" (Maclean in *Edinburgh Medical Journal*, September 1876) I have never been able to verify; it is probably an inference from the above-mentioned erroneous idea concerning the sewers. That the air is saturated with fecal emanations, I allow, but these proceed from the numerous outlets of the sewers and not from the soil or subsoil. One hears often of the dry and rocky soil of Malta, but those who use this expression take but a superficial view of the island. On the north-west coast are situated various valleys, notably Wied Emtahlep and Wied Gineyna, where a scanty soil rests on wet marl all the year round, and where "cases of intermittent fever now and then takes place in the labourers' cottages" (Dr. G. Gulia in *Il. Barth*, No. 1), and would no doubt, considering the structure of these valleys, take place oftener were it not that they are so thinly inhabited. These valleys are situated about ten miles from the barracks inhabited by the troops, and hence the marsh malaria from them can scarcely affect the soldier: but there is a place nearer at hand, indeed within a half a mile of the Floriana Barracks, productive of marsh malaria at certain seasons, viz., the Marsa. This is a low lying strip of alluvium at the top of the Grand Harbour, through which in the winter months a streamlet flows, forming the outlet of the surface drainage of a large part of the island east of the Bengemma Hills. In summer this streamlet is quite dry, or nearly so, but there are various water channels communicating with it supplied from wells in the marsh itself, and these are damp all summer through. This tract of land seems to have been formed from soil brought down by the streamlet above alluded to, and has been at an earlier period a sort of delta. An abundant supply of water is found a few feet below the surface of the Marsa, and early in the summer mornings a mist hangs over it, extending through the village of Casal Curmi to St. Antonio Palace and Casal Lia. In former years, before the improvements took place at the top of the Grand Harbour, the Marsa was much more swampy than it is at present, and the neighbouring villages of Casal Paolo and Casal Curmi were then much afflicted with marsh malarious fever in its various types. This has now disappeared from these villages, but cases of intermittent fever still occur amongst the residents (civilian) at the military laundry, which is situated on the edge of the Marsa itself. About a mile to the west of Valetta, there is the low-lying village of Misida; it is placed at the top of the Marsa Muscetto Harbour and at the entrance of the Bichicara Valley: the houses form two legs of a letter V and betwixt these is situated a swampy piece of ground, now in process of being filled up and drained, known as the "fish pond." Cases of intermittent fever occur amongst the inhabitants of this village. There are other places in the island where from their structure it might be inferred that marsh malaria would be developed, but from these no trustworthy information can be obtained. With all this evidence of the existence of marsh malaria in Malta, there can be no hesitation in accepting the opinion of Professor Maclean "that there is a stout thread of malaria running, so to speak," through some of the fevers of that station. To my mind there is only one thing which militates against that view, viz., quinine has no curative effect on these diseases: given in large doses, it reduces the temperature for a time, but nothing more. I am aware that because quinine benefits a febrile disease, this is not of itself sufficient evidence of the marsh-malarious origin of that disease, and the converse of this proportion may be true. On the whole, then, feco malarial fever may be supposed to be due to the constant inhalation of emanations from decomposing sewage, and to be complicated, in the majority of cases, with the poison of marsh malaria.

MALTA,

12th March, 1877.

NOTE by Dr. W. C. MACLEAN, C.B., Professor of Military Medicine, Royal Victoria Hospital, Netley.

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KNOWING the interest I take in the etiology of the fevers which prevail in the great fortresses of the Mediterranean, Surgeon-Major Donaldson was kind enough to send me for perusal, before publication, his contribution towards the right diagnosis of that hybrid form of fever to which I gave the name of typho-malarial; it will be seen that Dr. Donaldson objects to this name, and wishes to substitute that of *fæco-malarial*, on the ground, if I rightly understand him, that the term used by me, and which by the way is extensively used in India to designate a hybrid fever of the same kind, does not sufficiently indicate the faecal factor in the genesis of this protracted and distressing form of fever.

Now, it may seem hardly worth while to dispute about a name; the oft quoted "What's in a name?" will rise to the lips of many; but not to dwell on the obvious objections to the multiplication of names intended to designate one disease, I think we have here a capital example of a "distinction without a difference." If Dr. Donaldson wishes to have the faecal factor clearly defined, he need not exercise his ingenuity in seeking a term stronger than the abbreviated "typho" for "typhoid," which to my mind is the very type of a faecal disease, and which, for all practical purposes, sufficiently marks the poison that plays so active a part in the origin of this fever, without the introduction of a uselessly unpleasant word, or part of a word. The most refined people now a-days in general society talk freely of "house drains" and "drainage" and "sewer air," but whatever may be in store for us in the popular "Medicine of the future," I trust we are a long way off from having to talk about faecal fevers, when we can find another term that will as significantly indicate the *fons et origo* of the disease without the aid of a term so unsavoury.

I venture with more pleasure to point to a significant fact, noted by Dr. Donaldson as commonly observed in the *post-mortem* examinations of those who die of this typho-malarial fever, which I commend to the attention of those that say there is no malaria generated in Malta; it is this, the hyperæmia and softening in the upper part of the small intestine; a lesion of all others the most frequently noted by French and Italian physicians in the *post-mortem* examinations of those dying of the pernicious fevers of the malarial regions of Italy.

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## APPENDIX No. V.

CASE OF INTESTINAL OBSTRUCTION, FOLLOWED BY  
PERFORATIVE PERITONITIS.

By Surgeon-Major WILLIAM HENSMAN.

Private ———, 46th Regiment ; age 24 ; service 4 years in England and Bermuda. Previous disease in sequence, tonsillitis, acute rheumatism, synovitis, acute rheumatism. Admitted on 30th January, 1877, and had suffered for 3 days with colicky pains and constipation ; he also mentioned that he had eaten some oilcake : he was given a purgative.

Jan. 31. Colicky pains have continued all night, and the medicine has not acted ; there is vomiting, rather frequent, of the fluid contents of stomach : no signs of hernia.

Ordered.—Effervescing draughts every hour ; cal. gr. ii, opium  $\frac{1}{2}$ , every 3 hours ; turpentine stupe.

Feb. 1. Appeared to be improving, and the calomel and opium discontinued.

Feb. 2. Complaints of radiating pains, especially on left side ; constipation obstinate, no flatus passing ; vomiting stercoraceous ; abdomen tympanitic and distended ; great tenderness on pressure ; he sits up in bed and leans forward for relief ; much depression ; urine passed in normal quantity ; examination of rectum made, but no obstruction found.

An enema was given with a long tube, he was ordered 1 gr. of opium every 3 hours, and fomentations. In the evening the enema was repeated, and a warm bath given.

Feb. 3. Same way. Treatment continued.

Feb. 4. Great depression ; restless, and in great pain ; no relief to symptoms. Galvanism applied along course of colon, and an evacuation of soft faecal matter obtained.

Feb. 4. Depression more marked ; no relief. Died at noon.

Post-mortem, 24 hours after death.

External surface of body strongly discoloured by post-mortem changes, especially over abdomen. On exposing the abdominal contents, putrefactive changes had already set in ; the contents of the thorax, with the liver and stomach, were thrust upwards as high as the fourth rib. Peritoneum adherent to walls throughout, and darkly vascular ; some sero-purulent fluid was present in the pelvis.

Small intestines were swollen, distended, and inflamed ; proceeding downwards from jejunum the inflammation more marked ; ileum deeply discoloured.

Cæcum occupied the epigastrium, largely distended and gangrenous ; it contained three pints of soft bilious faecal matter ; there was a perforation, size of pinhole, from which the fluid contents escaped on handling ; the extraordinary position of this portion of the intestine is explained by what follows. Ascending colon was connected along nearly its whole length, and was closely approximated to the transverse portion, carrying the cæcum upwards into the epigastrium, forming a loop at the hepatic flexure, the connecting medium being a network of white opaque inelastic filamentous tissue with a tenacity equal to twine, not the result of recent inflammation, but of old date. Vermiform appendix was free from obstruction.

Descending colon contracted to 1 inch diameter, empty and free from disease. General peritonitis over surface of intestine ; recent soft exudations and flakes and shreds of lymph. A round worm was found in the bowel.

There was no intussusception or strangulation ; the finger could be passed from the distended cæcum to the contracted descending colon, but the intervening portion was so constricted and bound by adventitious tissue, that its vermicular action must have been very much weakened and spasm easily aroused, while passage through it must have been difficult at the best of times, and likely from slight causes to become arrested, distension following, with the symptoms and issue which have been recorded.

## APPENDIX No. VI.

A CONTRIBUTION TO THE ETIOLOGY OF HEART DISEASE  
IN THE ARMY.

By Surgeon F. ARTHUR DAVY, M.D.

MR. MYERS has done good service in bringing into prominence, by means of his essay—the “Alexander” Prize Essay—the causes which, in his opinion, are at work in the production of heart diseases in the army: for, the disability under which the army has laboured, in this respect, and continues to labour, is very great indeed. He points out the much greater prevalence of heart affections of all kinds among soldiers than among the civil population, although soldiers are most carefully selected:—and after giving due prominence to such influences in the production of organic and functional cardiac diseases as Bright’s disease, acute rheumatism, abuse of alcohol, syphilis, excessive smoking, &c., he rightly sums up that some other cause—to account for the excess—must be at work which is not at work among the civil population; and that that cause is to be found in the mechanical obstruction to the circulation which is exercised by the tightly-fitting clothing and accoutrements of the men. I am fully sensible of the importance of that conclusion; and it is much to be regretted that the soldier’s dress, as now regulated, does not allow that complete freedom from constriction, which, when work is expected of him, he ought to enjoy. But taking, as I do, mechanical obstruction to the circulation, and excessive strain on the heart, to be the causes of the excess of heart diseases among soldiers, I think it is to be regretted that, in the admirable essay alluded to, the conditions by which mechanical obstruction and excessive strain may be brought about, are not more fully considered. One condition, or rather set of conditions, which exercises a powerful influence in the causation of heart disease in the army has not been discussed. It will be the object of this paper briefly to point them out. I allude to the manner in which the early training of the recruit is conducted. Mr. Myers’ book has only the following paragraph on the subject. He remarks on the severity of the drill, but does not say in what the severity of it consists; and no solution is offered of the exhaustion induced by it:—“The training of recruits should extend over a longer period, and, like gymnastics, should not be severe at first. I have often seen recruits perfectly exhausted after their morning’s drill, and I am led to believe that the course of instruction they undergo is, owing to its severity, particularly obnoxious to them, and it is one which, with the present uniform, is very apt to lay the foundation of much heart disease in the army.” This exhausting drill is not further considered, but Mr. Myers’ remarks constitute strong evidence against it. Training ought not to result in exhaustion; if it does it is bad training. I hope to make it plain, in the few short paragraphs which I can devote to the subject, that cardiac irritability, resulting from deranged innervation of the organ, irregularity of rhythm, inequality in strength in the cardiac contractions, as well as hypertrophy and dilatation, with their possible consequences to the efficiency of the valves and to the aorta, have their starting point in a great proportion of the cases invalided in the orders of the drill sergeant; and that in obedience to him mechanical obstruction and strain are imposed on organs (especially on the heart) the integrity of which it should be the object of all training to preserve.

It will be well to state, at the outset, that I base the claim of the argument on a consideration of the degree in which the physiological conditions, under which the heart and lungs perform their functions, are altered by the treatment which the recruit undergoes from the commencement of his career; and that the resulting mischief bears a definite proportion to the degree of this alteration in each individual recruit. Those are most injuriously affected who most accurately carry out the orders of the drill-sergeant. Now, I do not say

that tight uniforms and ill-adjusted accoutrements do not aid in producing the unhappy result: their adverse influence has been amply demonstrated: but I do say that, if the clothing exercised no injurious influence whatever, mechanical obstruction to the circulation and excessive strain on the heart can be brought about by other means. I will now consider the means to this end provided in the drilling of the recruit.

The improvement of the physique of the recruit being the object in view, the following is one of the modes in which it is attempted to attain it. He is made to stand bolt-upright, his head well back, and his chest, being dilated to the fullest inspiration, is *kept* as much as possible so dilated. I need not specify this attitude of "attention" further; an attitude useful for no kind or description of work. This artificial dilatation of the chest is the point on which I wish to fix special attention. I will show good reason for calling it artificial later on. Now, let it first be conceded that the regulation drill-sergeant regards this expanded condition of the chest as the chief object to be attained in the recruits standing before him. He calls it "setting-up drill." The drill would not deserve the name without it. Any recruit in the squad who does not keep his chest thrown prominently forward, and fully expanded, soon has his attention called to the fact. For anybody who will not concede this point, the following remarks will have no weight. I believe the surgeons of the army will concede it. We have, doubtless, all remarked the manner in which the soldier dilates his chest, and keeps it dilated, when he is about to be examined with the stethoscope: much to the annoyance of the surgeon. It is the lesson taught him when he joins: he is to the manner trained, not born; for in examining men for enlistment, I have never seen this dilating of the chest resorted to; as civilians they do not think about their chests. Need I add that the caricaturist of the soldier never omits to represent him with an abnormally large and prominent thorax. Perhaps even such a fact may point to an important truth. But without any remarks like these, I think it will be allowed that the condition described is forced on the recruit by the "setting-up drill." Though conceding the point, an objector may ask, "What harm results; the training is supposed to be beneficial; and large capacity of chest is an advantage?" To that matter I shall come presently; now merely remarking that increased capacity is of no advantage when obtained at the expense of mobility. But I may reply for the moment by asking how (if no harm results) is the "severity" of the drill which Mr. Myers proclaims, but does not explain, accounted for: or the exhaustion which he has seen, as I have, result from it? If merely prolonged drilling produce it, say under a hot summer sun, how is it that the drill-sergeant is not overcome or "exhausted"? He has the additional work of vociferating loudly all the time. If his being older has anything to do with it, so much the more reason for dealing gently with the recruit. No doubt he exemplifies in his own person the attitude he wishes the recruits to assume, but he does so only occasionally and momentarily. They are compelled by him to *maintain* this attitude, while he walks about with his hands behind his back. By an application of the law of survival, or rather non-invaliding, of the fittest, he remains to victimize as he has been, perhaps, victimized, to some extent himself.

Let us now approach a body of dilated recruits as they are being drilled, and examine one of them. The first thing to be noticed is that there is great elevation of the ribs of full inspiration, even the scaleni muscles being in action. There is also great depression of the diaphragm; and the sternum is thrown forward. Our eyes are just being attracted to the abnormal character of the heart's impulse, when we mark with surprise that this distended condition of the lungs does not give place to a properly performed expiration; that little descent of the ribs occurs, or adequate elevation of the diaphragm: in other words, that the act of expiration is, to a great extent, in abeyance. This, because the recruit knows that he must, at all risks (discomfort notwithstanding, in most cases it does not amount to more at first), keep his chest expanded. Now, what consequences must certainly follow when this so-called training is persisted in day after day. I shall not speak of the heart just now; the consequences to it, of this training, are direct and immediate, as well as indirect. We know how inter-dependent the heart and lungs are; how influences affecting the heart soon affect the lungs, and *vice versa*; but it must



at once occur to the mind that, not only will the forces by which the important act of expiration is to a large extent accomplished in health (the elastic recoil of the lungs and of the chest walls) be, by repetition of this training, gradually diminished in power; but that, as the man stands before you, the blood in his lungs must be undergoing a deficient aëration. For as the diminution in size which takes place in the thorax when expiration is properly performed does not occur, it must follow that the air in the lungs charged with carbonic acid is not expelled to the usual extent to be replaced by new air from without. Now, in active exercise of any kind, it is of the last importance that expiration should be efficiently performed. Under these circumstances, a greatly increased quantity of carbonic acid having to be got rid of by the lungs, the respired, or charged, air needs to be expelled by strong expiratory movements, and fresh air inspired. In other words, the elastic power of recoil of the lungs and of the chest wall needs to be unimpaired. In very few soldiers have I found it so. The drill which the man before us is undergoing cannot be described as active exercise, and that is the only reason why the position is tolerable at all. Further reasons, showing that the chemical functions of the lungs are impeded by the maintenance of this attitude, will appear when the effect of it on the heart is being considered. Before proceeding to the latter I must add—what we should have noticed when inspecting the recruit at his drill—that in the gradual weakening of the forces by which expiration is normally performed, the overstretching to which the abdominal muscles are subjected by the training, is a very important factor. In normal expiration, the contraction of these muscles diminishes the cavity of the chest by pressing the viscera against the passive diaphragm, and so elevating it. In the artificial condition I describe, they are not only weakened by overstretching for this work, but their action is antagonized by the diaphragm being *kept* depressed.

I think it will be admitted, from the foregoing account (which I might extend by a full review of the mechanism of normal respiration—if this were necessary), that the degree in which the physiological conditions under which the expiratory act is performed in health is altered, is great. This alteration cannot take place with impunity. Pathological states commence when physiological conditions are departed from:—but I doubt, as concerning the result to the lungs, that the word “pathological” will be admitted by all. For myself, I am convinced that vesicular emphysema, to some extent, occurs in nearly all the men—during the period of this training—from the continued and excessive distension of the air vesicles. Hypertrophy of the elastic parenchyma of the lungs might be expected to occur on the “*ubi stimulus ibi fluxus*” principle; but if it does it will not be compensatory and tending to the restitution of expiratory power; but will cause pressure upon, stretching of, and partial obliteration of, the functional blood-vessels,—the pulmonary capillaries. I conclude, then, that you may increase the measurement of the recruit's chest rapidly in this way; but that you do so at the expense of its mobility—at the expense of vital capacity: and that the recruit is thereby more or less unfitted for active exertion—one reason for which result I have already given.

It has been shown that, sooner or later, the drill becomes distressing to the recruit. He is distressed, but still uncomplaining. It will be right now to inquire why it should so distress him. If good reason can be shown why it must distress him, and in some cases (as Mr. Myers has it) even “exhaust” him; it being at the same time admitted that exhausting, or even distressing, drill, cannot commend itself, on due consideration, to any well-regulated mind—then I consider that a claim will have been established to have this injurious drill discontinued. We noticed when inspecting the recruit at his drill that the cardiac impulse was abnormal. We must now see more minutely what is taking place. We cannot hear his heart beat as we stand before him—I daresay he hears it himself and feels it too—but we can learn a great deal by watching the cardiac region narrowly. The organ, as I said, suffers early; and even before the man thinks of complaining a pathological condition has commenced.

I propose, then, 1st, to describe the abnormal manner in which the heart acts in the dilated chest; 2nd, to give the causes of its abnormal behaviour; 3rd, to state why both one and the other (*i.e.*, the effect and its causes combined)

produce exhaustion, or distress, or discomfort, or a mere feeling of irksomeness, as the case may be. Lastly, to consider the pathological states of the organ which may be induced.

Now, I shall be excused undertaking for a few moments this task, which is the chiefest part of the inquiry in hand, in order that I may disclaim any intention of exaggerating the consequences of this "training." A cause loses much by being over-stated: more especially a cause like this, with tradition, prevalent mistaken notions of what "physique" means, military views, popular ideas, all against it. I would even take lower ground than Mr. Myers takes in the paragraph which I have quoted from his essay, lest it should be thought that I merely argued from the true and weighty statement which he makes, and leaves unsupported. It will be understood that I raise an issue quite distinct from the question of tight uniform and accoutrements, to which I shall, however, just allude presently. Now, pathological processes of great importance may proceed very quietly, and attract at first no attention on the part of the sufferer. Let us say the average recruit—speaking of those who withstand it best—would describe his dilating drill as merely irksome; or he might call it discomfort: I do not think he would often call it distress—at least in the earlier days. Some find themselves much distressed. But when the course of drill is over, he is just in the condition of heart (as we shall see) to be most injuriously affected by the next part of the training. For now come the pack, and the straps, and the rifle—too soon;—for of the many hearts whose irritability or actual hypertrophy, established in the drill-field, had not been so great as to cause complaint to be made, what a large proportion will rebel at the additional load. If only an interval of rest had been given for that great power of recovery which the heart, in common with all other organs, possesses, to come into play, very many who are ultimately invalidated, or who die, might be saved to the service. Officers in whom this "chest" drill induces this condition—about to be more fully described—are saved at this stage. There is no pack for them. They are free to recover—the private is not. Further, I would not be understood as saying that, in a short time, the men who suffer break down utterly, and become unfit for duty of any kind. This is the result to many of them. But I am sure that in the great majority of cases of heart complaints invalidated (other than those brought about by rheumatic fever, Bright's disease, &c., of which the history is to hand), the early link in the pathological chain was forged on the drill-field. There has preceded the date of appearance at hospital a long period of uncomplained-of discomfort, often distress; consisting of breathlessness on slight exertion, headache, and "beating." Now exertion has become unbearable. A man who never knew he had a heart (an expression many a soldier has used to me), becomes aware of his possession after a few months' dilating drill. He blames his recently-donned pack and traps for his trouble; forgetting that as a civilian he could have carried them manfully across country for ten or fifteen miles. Now, has this man been enlisted by mistake? Or have we made him what he is?

This has proved more of a digression than was intended. To return: We find then, firstly, that in the distended chest the cardiac impulse is lower down, and nearer to the middle line than it ought to be—the site of impulse often varying in successive beats: its area appears to be increased; it can be even *seen* to be abrupt and jerky, and in many instances there is marked epigastric pulsation. On placing the right hand firmly against the cardiac region, and the left on the back, we find the cardiac systole to be much more powerful than is natural; so much so sometimes that it shakes the body visibly. We are surprised at this, for the man has been only standing; and this excited action exceeds what would be expected even during active exercise. The condition of the walls and floor of the chest is maintained as before described; the respiration (shallow, and therefore increased in frequency), being performed by deficient elevation of the diaphragm (complete relaxation of it being prohibited) and very slight descent of the ribs; followed by the only further enlargement—by way of inspiration—that can take place: and this is very small, for lateral expansion has already been attained almost to the uttermost limit. The heart contracts about 110 times in the minute, the rhythm being irregular both in time and force, in many cases. The right ventricle is found to be acting unduly. The respirations average 40 in the minute. There is a curious mixture

of anxiety and resolution visible in the recruit's countenance. The man before us may have no hypertrophy as yet ; and no murmurs indicating valvular inefficiency can be heard.

Now, secondly, the state of heart just described points to impediment—to obstruction to the circulation. We shall now see how the obstruction comes about. Tight clothing, &c., may well be a cause of obstruction from without. I shall show that the attitude which the recruit is compelled to assume and *maintain* (for here lies the mischief) is a cause, more powerful, of obstruction from within. Let it be remembered that "as the thorax is a closed cavity, in which a partial vacuum is produced by the act of inspiration, whilst its contents are compressed by the act of expiration, the former state will favour the movement of blood from the large veins on the exterior of the cavity towards the heart, whilst the latter condition will retard it." This quotation is from Carpenter's Physiology. This author then proceeds to detail an experiment (to quote again) "showing the suction-power of the inspiratory movement, and the expellent force of the expiratory act." I will, further, copy the sentence next following in this well-known work. It is this:—"On the other hand the expiratory movement, while it directly tends to cause accumulation in the veins, will assist the heart in propelling the blood in the arteries." Can any one question the importance of these (or of any other) physiological laws? What, then, if the act of expiration be, to a great extent, in abeyance? A disturbance of the balance, which exists in health, between the pulmonary and the systemic circulations. This is the inevitable result—as we shall see. But will not the balance be restored as soon as the recruit is free from his tormentor; and allowed to breathe as nature would dictate? Yes, the balance will be gradually restored, and the heart will become quieter, only to be disturbed again at the next drill-hour. This is the manner in which we produce "physique"—the synonym for looking formidable on parade, and being useless for work: or else for doing the work in a condition of discomfort, distress, or exhaustion, as the case may be. I regret that I am betrayed into remarks such as these; but the British soldier is very brave. No man likes to "give in" less than he does. It is nothing short of pitiful to see him trained to break down, when the necessary "physique" might be secured by a little judicious padding, instead of at the expense of the heart and lungs. Considering that he is selected for being likely to prove efficient, I hold that—in time of peace at all events—the chances as regards heart disease are in his favour, rather than in favour of the civilian. I cannot now discuss this point. I am endeavouring to confine myself to the question of the artificial dilatation of the thorax embodied in the order "Swell your chest"; and just now to the manner in which the balance of the two circulations is disturbed by it—but I commend it to the serious consideration of the surgeons of the army, as being a tenable position, if only we would allow the soldier to breathe at all times physiologically as the civilian does—tight clothing and weight-carrying, in both cases, notwithstanding. The inspiration, then, a deep one—which the recruit takes at the word of command—produces physiologically an acceleration of the movement of blood from the large veins on the exterior of the chest towards the heart, which movement of blood towards the heart *had been retarded by the previously-occurring and duly-performed expiration*. Now, as expiration is not, after the word of command, again duly performed, and as the position of the thorax is one of deep inspiration and remains so—the diaphragm doing little to diminish the size of it, and the elastic recoil of the lungs and chest-walls being overcome by voluntary effort, does it not follow that, in a given time, a larger quantity of venous blood will have passed into the right side of the heart than would have passed if the check, or retardation, which the expiratory movement properly performed exercises, had been imposed? I do not quite contend for a "vis a fronte"; if that were established for a moment, it would soon be disestablished. The right ventricle contracts vigorously, but the blood it drives forward for aëration cannot part with as much carbonic acid, or receive as much oxygen, as if respiratory movements were normally succeeding each other all the time. The degree in which the exhalation of carbonic acid suffers hindrance is in direct proportion to the impurity (CO.) of the air in the ultimate air-vesicles. This air is only changed (if it can be spoken of as being changed) by the law of diffusion of gases; but in the absence of efficient

expiratory movements this law is at a considerable disadvantage, for the purpose required. If the recruit be now required to double—and when he is, he must maintain the same dilated state of chest, or be struck by the drill-sergeant below the epigastrium with a pace-stick—the dyspnœa is quite urgent. The right ventricle is much embarrassed. Now, this training causes dilatation in some, hypertrophy in others, both in most of those who suffer. Some do not appear to suffer. On inquiry you find these latter are nearer twenty-four than eighteen years of age. Even these may be the worse (without knowing it) for the drill. I would once more recall Mr. Myer's remarks to notice—the “severity” of the drill—the “exhaustion” he has seen. I think dyspnœa would be a good name to give to the exhaustion. Without saying more, it would call up the conditions which give rise to it. Dyspnœa in the recruit's drill-field means obstruction to the circulation, and obstruction to the circulation means excessive strain on the heart. This, again, means pathological changes in the shape of hypertrophy, with or without dilatation; and this, further, *may* mean (though, perhaps, it rarely does) inefficiency of the valves—for, if the orifices increase in size, the valves do not.

Now, the systemic circulation is also injuriously affected, for the engorgement of the lungs, arising as described, must, however slight, result in a retardation of the current of blood in the pulmonary veins, which is taking place towards the left heart: and not only so, but the arterial blood reaches the left ventricle insufficiently oxygenated, and also in deficient quantity. For, not only is the lining membrane of the pulmonary veins extremely sensitive to the passage of impure blood, but a most important movement—which is, perhaps, one of the chiefest aids to the advance of the arterialized blood towards the left auricle—the expiratory movement, is being held in check. The force of the right ventricle may be said to be expended in sending the venous blood to the pulmonary capillaries, and as some obstruction is already there, the pressure exercised normally on the pulmonary veins in expiration is much needed to maintain the circulation in them. The right ventricle does all it can, and hypertrophies, that it may do more by and bye. The left ventricle receiving blood deficient in quantity and in degree of aëration, the wants of the system are not duly supplied, and the muscular and nervous structures of the heart itself must suffer. But the contraction of a deficiently-filled ventricle is mischievous to the ventricle, as is also that of an over-distended one. And distension of one side, and insufficiently-filled state of the other, constitute, it must be admitted, a disturbance of the balance of the two circulations. Can we wonder, then, that when examining the recruit at his drill, we found his heart in the condition described? Is there not ample cause for it? The fact is, that expiration is forgotten (what does the drill-sergeant know about it?), and the erroneous opinion prevails that the man with the dilated chest is a fine, able, soldierly, fellow, although he might not be able to blow out a candle at a distance of two and a-half feet.

We shall see, on a little further inquiry, that the “swelling” of the chest, ordered by the drill-sergeant, is totally indefensible; and nothing but evil can follow it. It should be recognised that the full powers of expansion of the lungs should never be exerted by an effort of the will—except under peculiar circumstances. For instance, the singer—in anticipation not of the requirements of the system, but in order that he may have the requisite amount of air to expire for the execution of a passage which would suffer in effect if broken by a fresh inspiration—expands his chest to the full extent, to contract it again gradually but *immediately by a correspondingly deep expiration*. We take the same precaution in reading aloud, if we do not wish to draw our breath in the wrong place. It is for such requirements as these that the respiratory movements are placed so much, in the human subject, under the control of the will. But who will show that the breathing of the soldier on parade, marching, or doubling, should be conducted otherwise than automatically? The chest movements ought to vary in extent in accordance with the amount of blood sent into the lungs for aëration; which amount of blood, again, ought to be regulated by the natural forces which accomplish the movement of blood in the veins: but they ought not to be impeded by attention being in any way directed to them. Much less should they be grievously hampered in the way I have described. The movements of inspiration and

expiration (to put it more plainly) increase in depth, when the body passes from a state of rest into one of activity, for two reasons. Firstly, because the blood reaching the pulmonary capillaries is now flowing towards them more rapidly, owing to the pressure exercised, by the muscles, on the veins throughout the body. Secondly, because the demand for oxygen by the system is increased, owing to the increased chemical changes which take place as a consequence of muscular contraction. Now, the degree of chest-expansion which the recruit, as he stands to be drilled, is made to assume, is greater not only than would be automatically dictated by the conditions in which he is placed, but is even greater than that occurring as the physiological consequence of active exercise:—a degree of expansion, indeed, which *ought* to imply that vigorous muscular aid to the venous circulation was obtaining, and that, too, accompanied by movement of (as against a stationary state of) the body. Let us add these two conditions, making the man double—remembering that the chest *must still be kept* fully expanded—and what do we produce? At the very least we produce, as already shown, lung congestion, embarrassment to the right ventricle, and the consequent troubles which I will not again write of.

We come, thirdly, to the manner in which the recruit's distress is brought about. I find I have written diffusely, and that, under the previous headings, I have, perhaps unavoidably, shown that dyspnoea is a certain consequence of the respiratory movements being impeded. I need not now repeat how: but I will say once more that expiration is as important as inspiration. For four hours a-day is that important act, to a great extent, in abeyance—and that for a period of about six months—for the recruit. Dyspnoea then, according to its degree, involves exhaustion, distress, discomfort, or a mere feeling of irksomeness, as the case may be. I have said that those who most accurately carry out the drill-sergeant's orders suffer most. Now, some men can attain, owing to their figure in general assisting the effect, a degree of thoracic prominence sufficient to please the military eye, without any very great hyper-distension of the lungs with air. Even for these the word "irksomeness" would, as a rule, but feebly express their sensations. There are other men who, being less shapely—being, indeed, younger and unformed—can escape rebuke (and such rebuke! consisting of blows over the solar plexus, and very hard words) only by distending the chest with air to such an extent as speedily induces almost a doubling of the pulse-rate: of which result the deficient supply of blood to the left ventricle is the explanation. These men are distressed urgently, *in a few minutes*. An order to "stand easy" has not yet restored the disturbed balance of the pulmonary and systemic circulations, when this unphysiological process is commenced anew. This is obstruction to the circulation from within. It is worse than that (of tight uniform or accoutrements) from without. For, in the latter case the cause of the mischief is apparent to the sufferer—he can, and does in the fight, remove it. But he cannot know—and if he does he cannot remove—the disability inflicted on him in the drill-field: the existence of which it only required a little extra work and weight-carrying to make manifest. I say "a little" advisedly: for before enlistment has not the recruit either laboured all day in the field, or worked at his trade all day long with impunity? He must have done so, or he would not have been enlisted. The results of acute rheumatism to the valves we know: the palpitation and irregularity of heart's action due to anæmia, general debility, or hysteria, we also know: but what is this? It is the result of the recruits being "perfectly exhausted by their morning's drill," and afternoon's drill too, day after day. Even if it could not be shown to be injurious, does not common sense disavow such a mode of training? Mr. Myers condemns it from this point of view, giving no reasons. It may well be that he thought they were unnecessary. He holds this mode of training to be "one, which, *with the present uniform*, is apt to lay the foundation of much heart disease in the army." Now, in support of Mr. Myers' opinion to a certain extent, and in continuation of, or deduction from, my argument, I will state that the training of the recruit as now carried on is—with, or without, the present uniform—*certain* to lay the foundation of much heart disease in the army. Dismissing this important subject in a few lines, Mr. Myers says: "The training of recruits should extend over a longer period." This would be quite unnecessary, as far as regards their well-being: the cause of the distress being pointed out, remove

the great element in the training which induces it. Mr. Myers proceeds: "and, like gymnastics, should not be severe at first." It should not be severe first or last. Train a man for severity, but, in the training, stop short of severity. I am now alluding to natural fatigue—the result of healthful work or training—which, of course, should not be excessive, except for urgent military reasons.

Fourthly, and lastly, what pathological changes may be induced by recruit's drill?

It is too much the habit to say that cardiac affections are merely functional, when we do not happen to hear cardiac murmurs. Functional disturbances of cardiac action may be and often are accompanied by murmurs; but, when do we see such a case in the soldier? The fact is that, examine as we may, we cannot find the organ, or decide upon the general condition—say of *anæmia* or *plethora*—which is to blame for this so-called "functional" disturbance, in the soldier. The case, at first sight, looks much less urgent, much less serious, than functional derangement, properly so called. Look, then, for organic disease. What other name can you give to hypertrophy? This is not to say that you cannot have a case of irritable, or "soldier's heart," without manifest hypertrophy; but neither is it to say that "soldier's heart" does not result from organic changes in the organ. Hypertrophy is very common in the army, and the manner in which it is certainly, by this drill (perhaps sometimes recovered from), brought about (commencing in the right side) has been shown. Now (without repeating how), we saw that the blood reaching the left side of the heart was deficient, not only in degree of aëration, but in quantity, during the drill. The coronary arteries, then, convey more or less impure blood, in a deficient stream, to the muscular and nervous tissues of the heart. We also saw that the expiratory act is a powerful aid to ventricular contraction (Carpenter). The conditions of healthy ventricular contraction being so much altered, is it to be wondered at that rhythmical irregularity—due to partial arrest of the ventricular contraction—may be produced by a disturbance of the balance of power between the pneumo-gastric and the cardiac ganglia? Or, more commonly (Dr. Fothergill says), between the opposition offered to the blood to be driven and the power to drive it? Rhythmical irregularity is frequently associated with dilatation—though not necessarily so. We have a case of it now in hospital, of which the immediate exciting cause appears to have been very excessive muscular effort, in that much-to-be-condemned sport called "tug of war." (May I remark that when the tug of real war comes, such supreme muscular efforts are not wanted: staying power; weight-carrying power; presupposing an unimpaired condition of the heart and lungs—these are the qualities we look for.) There was no tight clothing in this case; but the right ventricle suddenly received more blood than it was able to dispose of, by the general and excessive muscular pressure on the venous system. This by the way. Valvular deficiency, though the valves be healthy, may result from distension of cardiac orifices. It would be beside the object of this paper to allude further to the possible consequences of the mischief commenced on the drill-field. It is right to say, however, that the great majority of the soldiers do not *complain* of recruit's drill. They endeavour to adapt themselves to, and to put up with, their new life and the inevitable distension; knowing that the better they do it, the sooner will they be delivered from the tormentor. Now, I will say again—though much repeating myself, I fear—that albeit the pack and other accoutrements may bring the mischief to light, they have only aggravated what they have been supposed in all cases to originate; *i.e.*, the excess of heart disease which obtains in military as compared with civil life.

I submit that I have shown that the mode of dealing with the recruit's chest is artificial, being in contravention of physiological laws; that it is injurious, and that to the most important organs of the body: that the causes of the visible embarrassment of the recruit's heart under training have not, in his interest, been sufficiently considered: that the embarrassment of the heart itself, which the training infallibly induces, has not been suspected of a significance that its continuance for many months for three or four hours daily might (as it does), induce organic disease;—in a word, that the recruit is the victim of the drill-sergeant's ignorance and superstition. I will add (though I

deprecate making any remarks that may appear to be beside the question), that the evil is all the greater because it is done in the name of good. It is difficult to root out errors that have long prevailed, and the army is very conservative. But this expiration question ought to be attended to. The remedy is quite a simple one. It could be effectively detailed on one of these sheets of paper—and handed, if authority were given—to every sergeant or corporal who henceforward drills a squad of recruits. The men would work well because they would feel well; they would go through thrice the amount of actual exercise, and return to their barrack-rooms undistressed and un-"exhausted." For, were they not selected only the other day as in all respects eligible? This point does not receive the attention it deserves. We ought not to treat it as inevitable, or say, in an indifferent, off-hand, way, "better invalid him," when we find a young soldier of only a few year's service—who has yet had none of the vicissitudes, but the contrary, of military life—never abroad perhaps, better off in, than ever he was out of, the Service—suffering from hypertrophy or dilatation, or both, or these combined with and causing valvular insufficiency. There has been no rheumatism or Bright's disease. He may have had syphilis. (Comparatively, how few heart affections can be put down to this cause?) Why is his heart hypertrophied? Why is he breathless except when at rest? Because he has been a "man of war" (without seeing war), for a year or two? What would have been the chances against his finding himself in his present plight if he had remained a civilian? Shall we put it all down to the tight tunic and accoutrements, or shall we pay any attention to what has preceded the wearing of them; namely, the distress and "exhaustion" of recruit's drill (according to Mr. Myers' testimony); the departure from the physiological conditions of the circulation and of respiration, which I have shown that drill to entail. What shall we assign as the cause of hypertrophy already developed in recruits not yet "dismissed drill," and who have been "trained" in a loose serge frock? I have several cases of this kind now under observation. Some of them complained of "beating," others were discovered accidentally. Will it be admitted that a case is made out for the recruit? or are we to fall back on tobacco, alcohol, excesses of any kind, except excess in military chest-making—for causes of this most common disability? Courts-martial are frequent. Do we not all know the soldier, who says he is "all right," whom, when we examine, before writing the required certificate, we find in the condition I describe? I am sure that if this mischief were not so universal, I would have modified the certificate many a time when I have not done so: and I might be slow to confess that I have often certified men to be fit for hard labour, trusting that, if it were awarded to them, they would, when in distress, appeal to the medical officer of the prison; if I were not obliged to reflect that discipline must seriously suffer if men, who state that they are "all right," were shielded (as it would appear) gratuitously. We are aware what a striking contrast would appear if the state of heart of, say, 50 civilians were compared with that of 50 soldiers—taking those who have never been known to complain of cardiac trouble—and taking any civilian men haphazard of about the soldier's age. The soldier ought to have the advantage here. But he has not. The civilian can accomplish the distance, and carry the weight with less distress than the soldier. Why? Because the soldier has been trained. Mr. Myers compares the amount of heart disease in the Foot Guards with that in the Metropolitan Police, with the usual result. The soldier suffers most. Now, I confess I do not know whether the tunics of the police can compare in degree of tightness with those of the Foot Guards. They seem trim enough, and tight about the neck. Their accoutrements, too, may be less of a load; but may I not suggest that there is a great difference in the amount of "chest-drill" performed by these two bodies of men. Although I make these remarks, I do not want them to be regarded as more than supplementary. The position I have tried to maintain is, that the recruit is compelled to outrage physiological laws, and that he must, and so must the Service for making him, pay the penalty. This is higher ground than as yet been taken in view of clearing up the question of the excess of heart disease in the army. I trust the surgeons of the army will take the matter up.

There are a few points, which I will not now touch upon, having an important bearing on the training of the recruit. These involve a consideration of the

influence on the heart of "extension motions," done by the arms, while the chest is fully expanded and the body stationary; of gymnastics; and other matters of lesser importance:—If there should appear any inclination on the part of the military authorities to abandon the present evil way of drilling recruits, these points can be quickly stated at another time, together with plain directions as to the manner of avoiding the injury to the heart and lungs now being inflicted. I am now glad to dismiss the subject—hoping that I may have succeeded in directing to it the anxious consideration, which I am convinced, it deserves.

VUE DU LAC, GUERNSEY,  
*August, 22, 1877.*

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## APPENDIX No. VII.

REMARKS ON THE NORMAL TEMPERATURE OF THE BODY  
IN THE TROPICS.

By Surgeon-Major J. CROSSE JOHNSTON, M.D., in Medical Charge, 43rd Regt.

THE normal temperature of the body in temperate climates, is given in text books as being about  $98^{\circ}\cdot4$  in the axilla, and  $99^{\circ}$  in the rectum, with some accession to this standard under exposure to high temperatures, such as is involved in residence within the tropics.

Assuming the standard as above given to be correct, observation has led me to doubt that the increase under the latter circumstances is either so constant or so considerable as has been assumed.

Dr. Becher's observations, as quoted by the late Dr. Parkes (*Practical Hygiene*, 4th Ed. p. 401), indicate an increase in body heat in the proportion of  $0^{\circ}\cdot5$  Fahr. for each degree of increase in the temperature of the atmosphere.

Taking, by way of illustration, the approximative mean temperature of this station at  $80^{\circ}$  Fahr., and that of Netley at  $51^{\circ}$ , we should expect to find, in conformity with the above rule, that the usual temperature in the axilla of healthy persons at Bellary would be about  $99^{\circ}\cdot9$ .

As the matter is of considerable interest and importance, it has been thought desirable to submit it to the test of observation.

The accompanying table exhibits the result of 224 readings taken from observations made night and morning for seven days consecutively upon 16 men in fair health, and who had not been less than three years resident in India.

The highest readings were noted in the case of No. 5 (Kenny), and concerning whom there appeared subsequently reason to believe that he had been suffering from some slight constitutional irritation.

The mean temperature of the air at Bellary during the time (September, 1876) when these observations were made, is given at  $81^{\circ}\cdot7$ . The corresponding approximative mean temperature at Netley for the same period being taken at  $58^{\circ}\cdot7$ , the observations at the former place should have exhibited a mean of  $99^{\circ}\cdot6$ , but the observed body heat had in fact a mean of  $97^{\circ}\cdot63$ , or  $1^{\circ}\cdot97$  less than would result from the application of Dr. Becher's formula.

So far as they go, these observations indicate a diminished rather than an increased ratio of temperature in inter-tropical life, the readings yielding an average of more than three-quarters of a degree below the standard of temperate climates.

P.S.—Some doubt having arisen as to the accuracy of the thermometers employed in the observations quoted in the foregoing remarks, a supplementary table of temperatures, including 320 readings, has been prepared, the records being the result of very careful experiment, and exhibiting a mean temperature corresponding very closely to that first arrived at, viz.,  $97^{\circ}\cdot74$ , notwithstanding that different instruments have been used.

*Bellary, 6th January, 1877.*

CHART OF NORMAL TEMPERATURE.

| No. | Names.    | 1st   |       | 2nd   |       | 3rd   |        | 4th   |       | 5th   |        | 6th   |        | 7th   |       | Average. |       | Mean temperature of the whole. |
|-----|-----------|-------|-------|-------|-------|-------|--------|-------|-------|-------|--------|-------|--------|-------|-------|----------|-------|--------------------------------|
|     |           | M     | E     | M     | E     | M     | E      | M     | E     | M     | E      | M     | E      | M     | E     | M        | E     |                                |
| 1   | Preston   | 97.40 | 97.20 | 98.00 | 97.60 | 97.40 | 98.00  | 97.20 | 98.40 | 97.40 | 98.00  | 97.20 | 98.00  | 97.40 | 98.00 | 97.42    | 98.02 | 97.70                          |
| 2   | Williams  | 98.00 | 97.20 | 97.00 | 97.40 | 97.20 | 97.60  | 97.00 | 97.20 | 97.20 | 97.40  | 97.00 | 97.60  | 97.00 | 97.00 | 97.48    | 97.34 | 97.27                          |
| 3   | Jones     | 97.00 | 98.20 | 96.80 | 98.20 | 97.00 | 97.40  | 97.00 | 98.20 | 97.40 | 98.00  | ...   | ...    | ...   | 97.04 | 98.00    | 97.92 | 97.32                          |
| 4   | Craven    | 96.80 | 98.00 | 96.80 | 97.60 | 96.20 | 97.00  | 97.00 | 98.00 | 97.00 | 97.20  | 97.60 | 98.40  | 96.60 | 99.00 | 96.80    | 97.90 | 97.30                          |
| 5   | Kenny     | 98.20 | 99.20 | 98.00 | 98.40 | 98.00 | 100.00 | 97.40 | 97.00 | 98.00 | 100.00 | 98.40 | 100.00 | 98.40 | 99.00 | 98.05    | 97.08 | 98.25                          |
| 6   | Mitchell  | 97.00 | 96.80 | 97.00 | 97.40 | 96.40 | 97.80  | 96.40 | 96.80 | 97.00 | 97.40  | 97.00 | 98.00  | 96.80 | 97.20 | 96.80    | 97.30 | 97.07                          |
| 7   | Fisher    | 97.80 | 98.00 | 96.80 | 98.20 | 97.20 | 97.80  | 97.00 | 97.60 | 97.40 | 96.80  | 97.00 | 98.00  | 96.80 | 98.00 | 97.01    | 97.08 | 97.45                          |
| 8   | Mahoney   | 97.40 | 97.20 | 98.80 | 99.20 | 97.40 | 98.20  | 97.00 | 98.40 | 96.80 | 97.00  | 96.80 | 97.40  | 97.00 | 97.40 | 97.70    | 97.80 | 97.92                          |
| 9   | Locke     | 96.80 | 97.80 | 97.00 | 98.40 | 97.00 | 97.40  | 96.80 | 97.60 | 97.00 | 97.40  | 97.00 | 98.20  | 97.80 | 98.20 | 97.05    | 97.80 | 97.45                          |
| 10  | Maxwell   | 97.50 | 98.40 | 97.20 | 98.00 | 96.80 | 97.00  | 97.20 | 98.20 | 97.20 | 97.40  | 97.40 | 98.40  | 97.40 | 98.60 | 97.30    | 98.02 | 97.70                          |
| 11  | Riches    | 98.00 | 98.00 | 97.60 | 98.40 | 97.20 | 98.40  | 98.20 | 98.20 | 97.80 | 98.20  | 97.40 | 98.40  | 98.00 | 98.60 | 97.70    | 98.80 | 98.02                          |
| 12  | Loneragan | 96.40 | 98.60 | 97.80 | 98.60 | 97.60 | 98.20  | 97.20 | 98.40 | 97.40 | 98.00  | 97.00 | 98.40  | 97.20 | 98.40 | 97.20    | 98.80 | 97.98                          |
| 13  | Galbraith | 97.60 | 97.40 | 97.80 | 98.20 | 97.60 | 97.80  | 97.40 | 97.80 | 97.60 | 98.00  | 97.80 | 98.00  | 97.40 | 98.20 | 97.80    | 97.80 | 97.97                          |
| 14  | Etheridge | 97.00 | 97.60 | 97.60 | 98.60 | 97.60 | 98.60  | 97.80 | 98.00 | 98.60 | 98.00  | 98.20 | 98.00  | 97.40 | 98.40 | 97.60    | 98.30 | 97.90                          |
| 15  | Williams  | 96.40 | 98.20 | 97.00 | 97.60 | 96.80 | 97.00  | 96.00 | 97.00 | 97.40 | 97.20  | 96.80 | 97.20  | 98.00 | 98.40 | 97.00    | 97.81 | 97.25                          |
| 16  | Weymouth  | 96.80 | 97.00 | 96.60 | 97.00 | 97.00 | 98.00  | 96.40 | 97.40 | 97.00 | 97.00  | 97.60 | 98.40  | 97.60 | 98.20 | 97.00    | 97.57 | 97.29                          |

Temperatures of 16 Healthy Men, as observed Night and Morning for one Week.

Bellary, September, 1876.

J. CROSSE JOHNSTON, Surgeon-Major, Army Medical Department.

## CHART OF NORMAL TEMPERATURES (SUPPLEMENTARY).

| No. | Days ...       | Names. | 1st   |       | 2nd   |        | 3rd   |       | 4th   |       | 5th   |       | 6th   |       | 7th   |       | Average. |       |       | Mean term of the whole. |
|-----|----------------|--------|-------|-------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|-------|-------|-------------------------|
|     |                |        | M     | E     | M     | E      | M     | E     | M     | E     | M     | E     | M     | E     | M     | E     | M        | E     | Mean. |                         |
| 1   | Norry ...      | ...    | 97.60 | 97.00 | 97.00 | 97.00  | 98.00 | 98.00 | 97.00 | 97.80 | 97.00 | 99.00 | 97.40 | 97.80 | 96.80 | 98.40 | 98.28    | 97.80 | 97.54 | 97.74                   |
| 2   | Potter ...     | ...    | 98.00 | 99.40 | 97.00 | 98.00  | 97.80 | 98.00 | ...   | 97.80 | 97.80 | 98.40 | ...   | ...   | ...   | 97.80 | 97.60    | 98.46 | 98.03 |                         |
| 3   | Harrop ...     | ...    | 98.40 | 98.00 | 97.80 | 98.00  | 97.00 | 97.60 | 98.00 | 97.80 | 97.80 | 98.40 | 98.20 | 98.40 | 97.40 | 97.80 | 97.75    | 97.94 | 97.84 |                         |
| 4   | Parker ...     | ...    | 97.20 | 97.80 | 97.40 | 98.00  | 98.00 | 98.40 | 97.80 | 98.00 | 97.80 | 98.60 | 98.40 | 98.40 | 97.00 | 98.40 | 97.57    | 98.17 | 97.87 |                         |
| 5   | Rycroft ...    | ...    | 97.80 | 98.00 | 97.60 | 100.20 | 98.20 | 98.00 | 98.40 | 98.60 | 98.40 | 98.00 | 98.40 | 98.40 | 97.00 | 98.40 | 97.97    | 98.42 | 98.19 |                         |
| 6   | Barlen ...     | ...    | 97.40 | 97.80 | 97.20 | 98.00  | 97.60 | 98.00 | 97.80 | 98.40 | 97.00 | 98.60 | 97.40 | 98.00 | 96.80 | 98.60 | 97.31    | 98.20 | 97.75 |                         |
| 7   | Williams ...   | ...    | 97.00 | 97.40 | 97.00 | 98.00  | 97.80 | 97.80 | 97.60 | 97.80 | 97.60 | 98.20 | 97.40 | 97.60 | 97.40 | 98.00 | 97.45    | 97.80 | 97.62 |                         |
| 8   | Flynn ...      | ...    | 97.00 | 97.80 | 97.20 | 98.00  | 97.60 | 98.00 | 97.60 | 97.60 | 97.80 | 98.00 | 98.00 | 98.20 | 97.40 | 98.40 | 97.37    | 98.00 | 97.68 |                         |
| 9   | Brayne ...     | ...    | 97.00 | 98.40 | 96.80 | 97.80  | 97.00 | 97.80 | 97.00 | 98.40 | 97.40 | 98.00 | 96.80 | 98.00 | 97.20 | 98.00 | 97.03    | 98.55 | 97.79 |                         |
| 10  | Beasley ...    | ...    | 97.60 | 98.20 | 97.60 | 98.40  | 97.00 | 98.00 | 97.20 | 98.00 | 97.60 | 98.00 | 97.20 | 98.40 | 97.40 | 97.80 | 97.84    | 98.11 | 97.72 |                         |
| 11  | McCoy ...      | ...    | 97.40 | 98.00 | 98.00 | 98.60  | 98.20 | 98.40 | 96.80 | 97.80 | ...   | ...   | ...   | ...   | ...   | 97.60 | 98.20    | 97.90 | 97.92 |                         |
| 12  | O'Flaherty ... | ...    | 97.20 | 98.40 | 97.40 | 98.20  | 97.40 | 98.40 | 97.20 | 98.00 | 98.00 | 98.20 | 97.20 | 98.60 | 97.60 | 98.20 | 97.57    | 98.28 | 97.92 |                         |
| 13  | Chambers ...   | ...    | 97.20 | 98.20 | 98.00 | 98.60  | 97.60 | 97.60 | 96.60 | 97.40 | 97.20 | 98.40 | 97.60 | 98.20 | 97.50 | 98.00 | 97.40    | 98.05 | 97.72 |                         |
| 14  | McCarthy ...   | ...    | 97.20 | 98.40 | 97.40 | 97.40  | 96.80 | 98.40 | 97.40 | 98.10 | ...   | ...   | ...   | ...   | ...   | 98.10 | 97.20    | 98.10 | 97.65 |                         |
| 15  | Burke ...      | ...    | 97.80 | 98.40 | 97.60 | 98.40  | 97.40 | 98.20 | 97.40 | 98.20 | 97.80 | 98.40 | 96.00 | 98.40 | 96.80 | 98.30 | 97.25    | 98.31 | 97.78 |                         |
| 16  | Jones ...      | ...    | 96.80 | 97.60 | 98.20 | 98.40  | 97.20 | 98.40 | 97.00 | 98.20 | 97.60 | 98.40 | 97.60 | 98.00 | 96.80 | 97.80 | 97.17    | 98.31 | 97.74 |                         |
| 17  | Bullen ...     | ...    | 97.00 | 97.40 | 98.40 | 98.40  | 96.20 | 97.80 | 97.00 | 97.80 | 98.40 | 98.60 | 97.20 | 98.40 | 97.00 | 98.00 | 97.12    | 98.20 | 97.66 |                         |
| 18  | Haasill ...    | ...    | 97.00 | 98.00 | 97.60 | 98.20  | 96.60 | 98.00 | 96.40 | 98.00 | 97.00 | 98.20 | 97.00 | 98.40 | 97.20 | 98.00 | 96.82    | 98.05 | 97.43 |                         |
| 19  | Burton ...     | ...    | 97.80 | 98.40 | 97.80 | 98.20  | 96.40 | 98.00 | 97.20 | 98.00 | 97.00 | 98.00 | 97.00 | 98.00 | 97.00 | 98.00 | 97.17    | 98.08 | 97.62 |                         |
| 20  | Wade ...       | ...    | 97.20 | 97.80 | 97.40 | 98.00  | ...   | ...   | ...   | ...   | ...   | ...   | ...   | ...   | ...   | 98.00 | 97.30    | 97.90 | 97.20 |                         |
| 21  | Edwards ...    | ...    | 97.40 | 97.60 | 97.80 | 98.40  | 97.00 | 98.00 | 97.20 | 98.00 | 97.20 | 98.00 | 98.20 | 98.20 | 96.80 | 98.00 | 97.30    | 96.62 | 97.66 |                         |
| 22  | Bolser ...     | ...    | 98.00 | 98.60 | 97.80 | 98.00  | 97.60 | 98.00 | 97.50 | 98.50 | 97.00 | 99.20 | 98.40 | 98.00 | 97.80 | 99.00 | 97.80    | 98.48 | 98.14 |                         |
| 23  | Robinson ...   | ...    | 97.60 | 98.60 | 98.40 | 98.40  | 98.60 | 98.00 | 97.50 | 97.60 | 98.20 | 98.40 | 98.60 | 98.20 | 98.10 | 98.40 | 97.08    | 97.82 | 98.21 |                         |
| 24  | Donnelly ...   | ...    | 97.60 | 98.00 | 97.60 | 97.80  | 98.20 | 98.60 | 97.60 | 98.60 | 97.60 | 98.20 | 98.00 | 99.00 | 95.00 | 99.00 | 97.82    | 98.45 | 98.13 |                         |
| 25  | Wynn ...       | ...    | 98.20 | ...   | 98.00 | 99.40  | 98.40 | 98.00 | 98.80 | 98.60 | 98.50 | 99.20 | 98.00 | 99.40 | 98.20 | 98.10 | 98.30    | 99.02 | 98.66 |                         |

## APPENDIX No. VIII.

**MEDICAL HISTORY OF THE LAROOT FIELD FORCE, INCLUDING  
TOPOGRAPHICAL AND DESCRIPTIVE REMARKS ON LAROOT  
AND PERAK, AND MEDICAL TRANSACTIONS OF THE BUFFS.**

By Surgeon-Major G. S. DAVIE, M.D., in Medical Charge of the Buffs, and  
Senior Medical Officer, Laroot Field Force.

Preliminary  
remarks.

In consequence of the murder of Mr. Birch, the Resident of Pérak, at Passu Lula, and the subsequent threatening attitude of the Pérak Malays, the Straits Settlements Government applied to the Government of India for additional troops.

Although telegraphic communication between Penang and India became interrupted before further information could be obtained, the Indian Government at once made arrangements for forwarding assistance.

Troops  
selected for  
the expedi-  
tion.

The troops selected for the expedition were the 3rd Battery, 5th Brigade Royal Artillery, quartered at Fort William, the 1st Battalion 3rd Regiment, the Buffs, quartered at Fort William, the 1st Goorkha Light Infantry *en route* from Dharmasala to the "Camp of Exercise" at Delhi, and C Company Madras Sappers and Miners from Rangoon; altogether, fully 1,200 men. Brigadier-General J. Ross, C.B., Commanding the Presidency District, was appointed to command the force. In the first instance, the force was known as the "Bengal Column Pérak Field Force," but on arrival at Penang, the designation "Laroot Field Force" was attached to it, to distinguish it from the force operating in Lower Pérak.

Before starting, a careful medical inspection of the European portion of the force was made, and all men not likely to stand the climate or the vicissitudes of active service were left behind.

Medical  
arrangements.

In communication with Dr. Kellie, Officiating Superintending Surgeon-Major, Presidency Circle, I made out indents for medicines, surgical instruments, appliances and hospital stores for the European portion of the force sufficient to last for three months. It was understood that the military operations would not extend over a period of six weeks. The medicines, instruments and stores were packed up in three distinct lots, the intention being, that in the event of portions of the force being detached, a complete hospital equipment would be available for each detachment. The lots were numbered 1st, 2nd and 3rd division respectively.

In correspondence with the Commissariat Department, estimates for medical comforts were made, and a liberal supply of everything requisite was furnished. Hospital bedding and clothing were provided at the rate of 10 per cent. of the strength. A suitable supply of disinfectants was put up in three lots.

The Barrack Department provided on requisition, camp furniture, portable commodes, mosquito curtains and two Macnamara filters for hospital use. Four Macnamara filters and 1 pocket filter at the rate of 10 per cent. of the European strength were recommended for the use of the troops, but not sanctioned.

For the transport of sick, doolies with 6 bearers each were sanctioned to the extent of 3 per cent. of the European force, and 2 per cent. of the Native. In addition 24 dandies, without bearers, which had been used with the Looshai expedition, were added.

Surgeon-Major Collis, the Buffs, having returned to Calcutta from privilege leave of absence on the 17th November, completed the medical arrangements, which appeared to be as complete as the time would allow and the necessities of the expedition required.

It was originally intended that there should be one general hospital for both European and Native troops, so as to economise hospital establishments, but the idea was abandoned, and separate hospital establishments and equipments were provided for European and Native troops.

The following medical establishment was sanctioned for duty with the European troops :—Surgeon-Major W. Collis ; Surgeon-Major G. S. Davie ; Surgeon G. F. Churchill ; Surgeon E. Townsend, the Buffs ; Surgeon J. A. Gormley ; Apothecary J. A. Eliot ; Assistant Apothecary W. H. Lowman ; Assistant Apothecary A. Luke ; Passed Hospital Apprentice C. Carroll ; Passed Hospital Apprentice J. Bell ; Hospital Apprentice A. A. Allison ; Hospital Apprentice G. W. Hayden.

Twenty-nine hospital attendants :—2 compounders, 3 cooks, 6 water carriers 6 sweepers, 6 ward coolies, 1 purveyor, 2 clothiers, 3 washermen.

The doolie bearers did not form part of the medical establishment.

For duty with the Native troops, there were two medical officers—Surgeon-Major Oldham, 1st Goorkha Light Infantry, Surgeon Bomford, I.M.D., and 10 hospital attendants.

The Madras Sappers and Miners and a Kling Coolie Corps were under the medical charge of Assistant Apothecary Prichard of the Madras establishment.

On the 20th November, 1875, the head quarters and two companies of the Buffs under the command of Lieutenant-Colonel Talbot A. Cox, and in medical charge of Surgeon-Major G. S. Davie, steamed from Calcutta in the hired troop-ship "Arabia," and, after a fine passage and without any sickness, reached Penang on the morning of the 27th November. The troops were comfortable on board, and the provisions were good. Summary of operations (Military).

On the 24th November, two companies of the Buffs, under the command of Captain Kerr, and in medical charge of Surgeon-Major Collis, sailed from Calcutta in the hired steam-ship "Abyssinia," and, after a pleasant voyage, reached Penang at noon on the 3rd December. One case of dysentery and one case of heat apoplexy occurred during the voyage.

A sailing ship, named the "Czarewitch," belonging to the Indian Government, containing the remainder of the Buffs and the 3rd Battery, 5th Brigade Royal Artillery, all under the command of Major F. Morley of the Buffs, in medical charge of Surgeon Churchill, was taken in tow by the "Abyssinia," and reached Penang all well at the same time.

On the 25th November, the hired steam-ship "Malda," with Brigadier-General Ross and Staff, and the 1st Goorkha Light Infantry on board, under the medical charge of Surgeon-Major Oldham, steamed from Calcutta and reached Penang on the evening of the 3rd December. Three cases of cholera occurred among the natives on board, one of which (a doolie bearer) proved fatal.

The head quarters and two companies of the Buffs, which reached Penang on the 27th November, remained in the Harbour at George's Town, on board the "Arabia," till the 29th, and on the evening of that day, after embarking C Company Madras Sappers, which had just arrived from Rangoon, steamed for the mouth of the Laroot river. This was reached on the morning of the 30th, and a small steamer, named the "Langkat," arriving at the same time, the Buffs were transferred to this, and conveyed about nine miles up the Laroot river to a landing place named Teluk Kertang. About half-an-hour before reaching the landing place, it began to rain in torrents, and all got thoroughly drenched. A Chinese salute of three guns welcomed the arrival of the first European troops in Laroot. The rain ceasing after landing stores, the Buffs disembarked and marched over a very swampy road to a large village named Matang, one mile distant, where a shelter shed had been erected by Captain Speedy. Here the men had their dinner comfortably, and at 4 P.M. resumed their march, and at dusk reached a small village named Sampong, where they were accommodated for the night in empty houses. Arrival in Laroot.

The road was tolerably good. At Sampong the mosquitoes were very troublesome. Owing to some delay in getting the camp equipage up next

morning, an advance could not be made till 10 A.M. After an oppressive march on account of the heat, over a fairly good road, Bukit Gantang, nearly six miles distant, was reached at 12.30 P.M. The men were a good deal exhausted, and about 20 fell out, but soon recovered after a little rest and removing encumbrances from the chest. At Bukit Gantang the jungle had been cleared from a small piece of ground to serve as an encamping ground, and on the arrival of the tents, the camp was pitched. Before this could be completed, however, the rain came down in torrents, flooding the camping ground, and drenching everyone. A bright sun shewing afterwards the ground soon dried. Advantage was taken of a small stream to have a bathing parade, and this, followed by a tot of rum, refreshed and cheered the men.

Transport  
defective.  
Gapes  
Stockade  
occupied.

Owing to insufficient transport, a halt was made at Bukit Gantang till the morning of the 4th December.

On the morning of the 2nd, half a company of the Buffs, under the command of Captain Graham, was detached to hold a stockade commanding the eastern approach to the Brapit Pass named Gapes Stockade. An hospital apprentice with a field companion and two dandies accompanied the detachment. The doodies (Morley-Collis) were *hors de combat*, although brought on empty, and had to be abandoned.

The mosquitoes swarmed in myraids at Bukit Gantang after sunset, and sleep till early morning, when they appeared to be satiated, was out of the question.

On the morning of the 4th December, sufficient transports having been procured for the men's kits and hospital stores, but not for the camp equipage, which had to be left behind, the march was resumed towards Campong Boyah at 6.30 A.M. After a pleasant march over a very unequal road, through paddy fields, a mountain pass (Brapit) and jungle Campong Boyah Stockade was reached at 9.30 A.M. Not a man fell out. Here shelter sheds were erected sufficient to accommodate 200 men, so that the camp equipage was not missed. The Brapit Pass appeared to be the boundry line between the zone of mosquitoes and rain and the opposite. For the first time, since the 30th November, there was no rain and no mosquitoes, and this pleasant state of affairs lasted during the five days' halt at Campong Boyah. Several European privates' tents coming up, I had one pitched in the centre of the stockade as a temporary hospital.

On the morning of the 8th December, the Madras Sappers coming up were pushed on to Qualla Kangsa to construct huts. On the evening of the same day, General Ross and Staff arrived. On the morning of the 10th, sufficient transport having been collected, the head quarters and one company of the Buffs marched towards Qualla Kangsa at 6.30 A.M. Half a company was left to hold Campong Boyah Stockade. Qualla Kangsa was reached at 9.30, although the road was simply an elephant path through dense jungle, paddy fields and swamps. Shelter sheds had been erected sufficient to accommodate 200 men, and these were occupied by the Madras Sappers and the Buffs. The Madras Sappers and a gang of Chinese carpenters were busy constructing huts, and in a few days huts sufficient to accommodate 300 European troops and a small hospital hut were constructed. As yet there was no sickness, and the men appeared to be in remarkable good health, although they had a rough time of getting to Qualla Kangsa.

It was intended that the Laroot Field Force, after arrival at Qualla Kangsa, should proceed down the river Perak in rafts as far as Blanja, and there meeting General Colborne's force, pushing up the river, make a combined movement towards Kinta, the private residence of the Ex-Sultan Ismail.

Employment  
of the troops.

This plan was soon found to be impracticable, as materials for rafts could not be obtained, and boats were scarce, and, under the circumstances, a forward move was considered impossible. The troops were therefore employed all day clearing jungle. Meanwhile the remainder of the troops began to arrive.

On the 9th December, Surgeon-Major Collis, who had reached Matang, having experienced an attack of heat apoplexy, was sent back to the steam-ship "Arabia," and, for the time, the duties of senior medical officer devolved on me. On the 11th December, 24 gunners and 50 Goorkhas reached Qualla Kangsa. On the 12th, General Ross and Staff arrived, and gave impetus to jungle clearing and road making.

Two companies of the Buffs were sent from the mouth of the Laroot river to Malacca in the "Abyssinia," as it was feared that an outbreak would occur there. At the same time 36 gunners and 350 Goorkhas were sent to Rassa.

On the 14th December, 50 Buffs and 50 blue jackets, belonging to the "Modesti," arrived at Qualla Kangsa, and on the evening of the same day, 30 of the "Modesti" blue jackets proceeded to the bank of the river Pérak to seize several large boats.

They succeeded without opposition. On the 15th, 50 Buffs and 50 blue jackets belonging to the "Philomel," arrived under the medical charge of Surgeon Williams of the "Philomel."

The two companies of the Buffs which had gone to Malacca, after lying off that place for a few days, returned to the mouth of the Laroot river, and one company had reached Bukit Gantang when both companies were again ordered to Malacca, and there they remained in garrison till the close of the operations and the return of the Laroot Field Force to Bengal.

On the 17th December, Surgeon-Major Collis, although very weak, arrived in a doolie, and next day resumed the duties of "Principal Medical Officer."

On the 18th, 50 Buffs and 10 gunners under the medical charge of Surgeon Churchill came to the front. Surgeon Townsend was detained at Campong Boyah Stockade, and Assistant Apothecary Lowman relieved Hospital Apprentice Allison at Gapes Stockade, where there were now only 25 men under a subaltern. As the troops came up they were employed in clearing jungle, digging out roots, levelling ant hills and road making. It was hot and harassing work, but as yet did not affect the health of the men.

General Colborne having reached Blanja, and meeting some opposition, Reinforce-  
ments for  
Blanja. applied to General Ross for troops: accordingly, on the 19th December, sufficient boats and rafts having been collected, 50 Buffs, 50 blue jackets of the "Modesti," and 50 Goorkhas, all under the command of Lieutenant-Colonel Storey, and medical charge of Surgeon Williams, R.N., proceeded down the river to Blanja at 8 A.M., and arrived at 5 P.M., the distance being about 20 miles. On the 20th December the last remaining 50 men of the Buffs arrived. On the afternoon of the same day, 20 of the "Philomel" blue jackets poled up the river Pérak in boats, a distance of two miles, to reconnoitre, and returned at dusk without having seen any signs of hostility.

On the 21st December, telegraphic communication was established between Matang on the Laroot river and Qualla Kangsa. The Malays in the vicinity of Qualla Kangsa appeared to be either frightened or sulky, and did not bring in any supplies, but otherwise did not appear to be unfriendly; and, in consequence, no defensive precautions were as yet taken. On Christmas Day games were got up for both officers and men, and proved an agreeable break in the monotony of ordinary fatigue duties.

On the 27th, a party of blue jackets poled up the river in two boats to Chuga Qualla, a distance of about 15 miles, and returned at 9.30 P.M., having seen little, and met no resistance. On the 2nd January, 1876, a party of blue jackets, accompanied by Mr. Maxwell, Political Officer, and some friendly Malays, proceeded up the river to capture three escaped convicts.

In consequence of a sudden rise in the river, they did not reach their destination as soon as they expected, and only succeeded in capturing one of the convicts, and him they hanged on the nearest tree. After burning the convicts' houses they returned to Qualla Kangsa unmolested.

Owing to the inhabitants of Kota Lama, a large village two miles up the river from Qualla Kangsa, showing signs of hostility, and using threatening language to the friendly Malays, stating that if the troops at Qualla Kangsa did not attack them, they would attack Qualla Kangsa, it was decided to disarm them.

Accordingly, early on the morning of the 4th January, 150 Buffs, 12 gunners with a gun and rocket trough, 20 blue jackets with a gun and rocket tube, and 40 Goorkhas, all under the command of Lieutenant-Colonel Cox, the Buffs, proceeded up the river Pérak. Colonel Cox with 100 Buffs, 12 gunners, and 20 Goorkhas, accompanied by Mr. Maxwell, the Assistant Political Officer, crossed to the left bank of the river in boats, and marched towards Kota Lama on the left bank. Fifty Buffs under Lieutenant Leslie, and 20 Goorkhas under Burning of  
Kota Lama.

Captain Young, accompanied by Captain Speedy, the Assistant Commissioner, and some Sikh and Malay police, marched towards Kota Lama on the right bank. Twenty blue jackets under the command of Captain Garforth of the "Philomel" poled up the river in two large native boats. Brigadier-General Ross and Staff followed in a small steam cutter. Surgeon Townsend accompanied the Buffs on the left bank of the river. The Malays of Kota Lama on the right bank of the river quietly submitted to be disarmed, but on the left bank they seized their arms, shut up their houses and ran away. Colonel Cox having reported these circumstances to the General, and expressed his inability to surround the place with the number of men at his disposal, got orders to burn all the deserted houses. The Buffs burned a good many houses unmolested, and were burning away when the General and Staff, with a small escort of Goorkhas, followed by some blue jackets, landed from the boats, and were shortly afterwards attacked by the Malays, who no doubt were watching their opportunity. After some smart fighting the Malays were beaten off, leaving several dead behind them. The loss on our side was severe. Major Hawkins, Brigade-Major, killed by a spear wound through the body; one blue jacket killed by a spear thrust through the body; one Goorkha killed by a spear thrust through the body. In every case penetration was from behind, and the body completely transixed; all the killed ran some distance after being wounded, and the Goorkha had just reached the hospital in a dandie when he expired. In addition, Surgeon Townsend, who had got separated from the Buffs, sustained a spear wound (severe) in the right arm, and another (slight) in the left leg, but was able to attend to the wounded afterwards. A marine sustained three spear wounds in the abdomen and hands, but lived till next day. Two Goorkhas were wounded in the arms.

The Buffs met no opposition, and after reaching the scene of action and burning a few more houses, returned without loss to Qualla Kangsa. When the Malays attacked, Lieutenant Leslie with his Buffs were brought across the river. The artillery also brought a gun to bear on the Malays.

Extra duties.

After this engagement there were rumours of assembling Malays, and, after dark Malays were seen prowling about in the vicinity of the camp causing alarms; in consequence, Colonel Cox commenced to throw a palisading round the camp; extra sentries and patrols were posted at night, and the troops told off to alarm posts.

These extra duties began to tell on the health of the troops, and dysentery of a severe type became prevalent. On the 9th of January an officer's servant and a Malay policeman were killed by the Malays between Campong Boyah and Gapes Stockade; the same night the telegraph wire was cut and 30 yards of it carried away.

Malays attack working parties.

On the morning of the 14th January the Malays attacked the working parties on the south and north-west sides of the camp, probably expecting that they were unprotected by covering parties. They drove in the working parties and fired on the camp, one bullet passing through the hospital. The troops having taken their posts, soon beat the Malays off, and caused them considerable loss during their retreat. On our side one man of the Buffs was shot through the left thigh, and a sergeant of the Madras Sappers shot in the left thigh. During this encounter the Malays evidently got more than they bargained for, as they refrained from attacking working parties again, and satisfied themselves with attacking when there was no likelihood of any hurt happening to themselves. For example, on the 17th January two Sikhs carrying a mail bag were shot in the Brapit Pass, and the contents of the mail bag for the most part destroyed; but it would not do to let this kind of work go on, so, on the morning of the 20th January, 120 Buffs and 40 Goorkhas, under the command of Major Morley, the Buffs, crossed in boats to the left bank of the river; 20 gunners with 2 guns and a rocket trough, 50 Buffs and 40 Sikh and Malay police, marched up the right bank of the river, 25 blue jackets, in a gun and rocket boats, poled up the river, all were under the immediate command of General Ross, who went up the right bank of the river. Surgeon-Major Davie accompanied the troops on the right bank of the river, and Surgeon Townsend those on the left.

Second attack on Kota Lama

The troops under Major Morley having made a circuit of the village of Saiyon, opposite Qualla Kangsa, proceeded towards Kota Lama. The troops



on the right bank of the river, on arriving opposite Kota Lama, opened fire with shell and rockets, which was taken up by the blue jackets on the river, and by the troops which were at Qualla Kangsa under Colonel Cox. The Malays were completely taken by surprise, but before retreating, fired a few volleys on the troops on the right bank without result. On the firing from the guns ceasing, Major Morley's column advanced and caught the retreating Malays in flank, accounting for several of them. The Malays left war gongs, guns, rifles, muskets and arms of various kinds behind. All the houses left unburned on the 4th January were now reduced to ashes, and after a nine hours' outing, the troops returned to Qualla Kangsa without loss. The Malays must have suffered severely, as several dead bodies were afterwards found, and it is not the custom of the Malays to leave their dead behind if they can help it.

On the 26th January, 250 Goorkhas under the command of Colonel Clay arrived of the joined the force from Rassa; 50 were detained at Bukit Gantang to assist Goorkhas. Captain Speedy in capturing Kota Lama Malays, on some of whose heads a price had been put, but they did not capture any.

On the 28th January, Surgeon-Major Collis, who had never properly recovered from his apoplectic seizure at Matang, applied for a medical certificate to enable him to proceed to Penang. He left on the 31st January, and the duties of senior medical officer again devolved on me.

On the morning of the 3rd February, information having reached that the Kota Lama Malays had again returned and challenged Raja Yusuf (Raja Muda) to fight, the Raja Muda with his Malays went after them, and in the afternoon 50 Goorkhas crossed to the left bank of the river, and 20 blue jackets poled up the river to assist. Surgeon Townsend accompanied the blue jackets.

The Goorkhas had some skirmishing with the Malays, but both blue jackets and Goorkhas returned at dusk without loss. The Raja Muda had two of his men killed and two wounded.

At daybreak on the 4th February, 150 Goorkhas, under the command of Colonel Hill, crossed to the left bank of the river; 100 Buffs, under the command of Colonel Cox, 12 gunners, with one gun and rocket trough, proceeded up the right bank of the river; 25 blue jackets poled up the river in boats, all under the command of General Ross. Surgeon-Major Oldham accompanied the Goorkhas on the left bank, and Surgeon Townsend the troops on the right bank. The European portion of the force took half rations, and the Goorkhas a day's rations, together with their waterproof sheets and blankets.

On reaching Kota Lama, the Goorkhas exchanged some shots with the Malays, and the Malays of a village named Enugar opened fire on the troops on the right bank, but were dislodged with shot and rockets; the Goorkhas then coming up reduced the village to ashes. It appeared that the chief of this village was engaged with his men in the attack on the working parties on the 14th January—hence the retribution. After having rested a little and refreshed themselves with biscuit and tinned meat, the troops on the right bank returned from Jumawan to Qualla Kangsa, after having been out twelve hours without loss.

The Goorkhas bivouacked all night close to Enugar, and at daybreak on the 5th, proceeded inland to a village named Pérak, to which the Kota Lama Malays had retreated. The Malays had placed numerous obstructions in the way, and had laid an ambuscade. After the Goorkhas had advanced some distance, and were defiling along the jungle path, they were fired on from the opposite side of a small stream, but, beyond damaging a soldier's pouch and cross belt, the fire did no harm. The Goorkhas were immediately after the Malays, and in so great a hurry were they to escape, that they left several spears behind that they had stuck in the ground when firing. On reaching the village of Prék, shots were again exchanged, resulting in Colonel Hill being hit in the ankle by a spent bullet. An occasional shot was fired by the Malays as they retreated from the village which did no damage. The village was burned, and large quantities of rice, clothing and other stores destroyed. The Goorkhas then crossed to the right bank of the river Pérak, down which they marched to Qualla Kangsa.

On the 7th February, half a company of the Buffs, in medical charge of Troops for Blanja

Surgeon Townsend, proceeded down the river to Blanja, to complete the company there.

General Colborne visits Qualla Kangsa. The blue jackets rejoin the "Philomel."

General Colborne visited Qualla Kangsa on the 10th February, and on the morning of the 11th, inspected all the troops, and afterwards the General Field and Goorkha Hospitals. On the morning of the 12th, General Colborne and Brigadier-General Ross left for Singapore. The same morning the blue jackets belonging to the "Philomel" started to rejoin their ship.

Orders having been received that the Bengal Force was to return to India as soon as possible, arrangements were commenced to move hospital stores down towards the Laroot river to be ready for shipment.

On the 7th March, the Goorkha sick and hospital establishment left Qualla Kangsa for the sailing ship "Czarewitch," anchored at the mouth of the Laroot river.

3-5th Royal Artillery left behind.

It having been decided that the battery of artillery would remain behind for the present, Surgeon Gormley, attached to the Buffs, was detailed to be attached for duty to the battery, and, owing to the paucity of medical officers in the Straits Settlements, the Straits Settlements Government applied to General Ross for the services, temporarily, of another medical officer; accordingly Surgeon Townsend, attached to the Buffs, was directed to remain at Blanja for duty with a detachment of the 80th Regiment till further orders.

The Buffs leave Pérak.

On the 13th March the head quarters and one company of the Buffs marched towards the Laroot river.

On the 14th followed the European sick and hospital establishment.

On the 15th the company of the Buffs at Campong Boyah and Gapes Stockades.

On the 16th one company of the Buffs from Qualla Kangsa.

On the 17th the remainder of the Goorkhas.

On the 18th the doolie bearers and coolies.

The two companies of the Buffs at Malacca embarked on board the "Himalaya" on the 9th March.

The Buffs, at the mouth of the Laroot river, embarked in detachments on the 15th, 16th and 17th.

The company at Blanja left on the 15th March, and joined the "Himalaya" at Penang.

All the troops and followers having embarked, the Buffs and one company of Goorkhas on board the "Himalaya," the Goorkhas and followers on board the "Czarewitch" and "Arabia" proceeded towards Calcutta on the evening of the 19th March.

Topographical and descriptive remarks.

The province of Pérak is situated on the west coast of the Malay Peninsula, and extends from 3°59 to 5°10 north latitude, and 100°10 and 102°5 east longitude.

The Malayan chain of mountains bounds it on the east, and the sea on the west. Several rivers flow from the Malayan chain to the sea, and chief among these are the Pérak and Laroot rivers. The mouth of the Laroot river is obstructed by a bar which, at high water, only admits vessels drawing about 8 feet of water. Vessels of this draught can steam up the river to Tiluk Kertang, a distance of about nine miles. Above this the river is navigable for small boats and canoes to a distance of fifteen miles. The current is sluggish, and the banks flat and swampy, and covered with dense mangrove jungle to the water's edge. Crocodiles are numerous, and fish of various kinds abound.

Landing place, Laroot river.

The landing place is at Tiluk Kertang, where the river is about 60 yards wide, and lined with dense mangrove jungle. From Tiluk Kertang to Matang, the chief town in Laroot, the distance is one mile; the road is swampy and liable to be flooded by the tide, and has dense jungle on both sides.

Matung.

Matung is a pretty large village, inhabited by Chinese and Malays, and lies in an angle of the road. The houses are constructed of wood, bamboo, and thatch made out of the leaves of a kind of palmite and named *Atups*. There are some very fair shops kept by Chinese, at which European stores may be obtained. At Matung there is a police magistrate, a prison, a post office, a custom house, and the Mantri of Laroot has a fortified residence opposite the prison.

From Matung to Sompang, a distance of about 3 miles, there is a tolerably good cart road, about 15 feet wide, for the most part lined by dense jungle,

but with here and there a small clearing effected by Chinese. Clear streamlets flow along both sides of the road, and the ground in the vicinity is marshy.

Sampong is a smaller village than Matung, and, like Matung, is inhabited by Sampong. Chinese and Malays; beyond a few shops, there is nothing of any interest connected with it.

Thai Ping, the residence of the Assistant Commissioner, Captain Speedy, is about 4 miles distant, and in the vicinity are valuable tin mines worked by Chinese.

From Sampong to Bukit Gantang, a distance of nearly 6 miles, the road is tolerably good, and becomes undulating as Bukit Gantang is approached.

It may be stated generally that the country is flat and swampy to a distance of about 12 miles from the sea coast, then becomes undulating, then hilly. The road is still lined by dense jungle, with here and there paddy fields; streamlets of clear water frequently intersect and run along the sides of the road.

Bukit Gantang is a picturesquely situated small village, chiefly inhabited by Chinese traders and Coolies. Here the Mantri of Laroot has his residence and the affairs of State are transacted. Densely wooded hills rise to a height of from 500 to 3,000 feet on the north, south and east sides of the village, which break the rain clouds and give the place fully its own share of rain. Cocoa palms, plantains and wild nutmeg are abundant, and the betel palm is extensively cultivated. A small lake to the west of the Mantri's residence, in part covered with pink lilies, and from which issues a small stream, serves to add beauty to the spot. It has its drawbacks; leeches are very numerous, and the air is alive with mosquitoes after sunset.

From Bukit Gantang to Campong Boyah Stockade, a distance of nearly 9 miles, the road for a short distance is fairly good, and there are extensive paddy fields on either side. The Brapit Pass is then entered, and the grandeur of the woodland scenery strikes the eye at once. The road degenerates into a rugged foot-path intersected by numerous streams of cool and limpid water. The hills on either side are thickly wooded, and rise to a height of about 1,000 feet. There are numerous primeval forest trees with gigantic creepers twining about in every direction. A remarkable tree of very hard wood, named the Buttress tree, growing to a height of fully 200 feet, is conspicuous here and there. Various species of palmite are to be found, and wild plantains and nutmeg are numerous. All along the pass (nearly  $2\frac{1}{2}$  miles) the hill sides are covered with enormous granite boulders, which here and there almost block up the pass. The soil has a surface of mould with disintegrated granite and clay underneath. On a commanding site at the middle of the pass, there is a small stockade held by Sikh police. The east end of the pass is commanded by Gapes Stockade, which consists of three houses surrounded by a palisading. Beyond this are paddy fields, and a peculiar isolated hill rising abruptly from the paddy fields and composed almost entirely of limestone, named Gunong Pondoh. On its vertical sides are to be seen large excavations with depending stalactites, and the slopes are densely wooded. It has an elevation of nearly 1,000 feet, and viewed from different directions assumes various shapes, but the most characteristic is that observed from the east or the west, when it appears like a huge shark's tooth. Two miles beyond this is Campong Boyah Stockade; it is partly entrenched and has a ditch round it. In the immediate vicinity are cultivated fields and jungle. Further off, on the south and east sides, are wooded hills, rising to a height of from 500 to 4,000 feet. On the east side, immediately outside, there is a Malay village with a mosque, and beyond this a stream named the Kungser, which flows into the river Pérak at Qualla Kangsa. On the south side there is a small lake. The soil is of a rich alluvial nature, and paddy, Indian corn, and sugarcane grow freely. Cocoa and betel palms thrive well. In the jungle are birds of various sorts, monkeys, wild pigs, deer of sorts, wild dogs and leeches. There are very few mosquitoes.

From Campong Boyah to Qualla Kangsa the road was a mere elephant path through dense jungle, paddy fields and swamps; the ground is undulating, and has a steady rise towards Qualla Kangsa. Just before reaching the Kangsa is crossed, numerous streams intersect the path, some of which have rough culverts over them. The distance is under 7 miles.

Qualla Kangsa is situated on the right bank of the river Pérak, immediately below the mouth of the Kangsa. The stockade has an elevation of 70 feet Kangsa.

above the river Pérak, commands the country round, and is the residence of Inchi Meda, a Malayan princess. On the arrival of the troops there was a Malay village between the stockade and the Kangsa, and to the east of this a police station. These were afterwards utilised for troops.

On the opposite bank of the Pérak, there is a large village named Saiyong, and two miles up the river a large village, since destroyed, named Kota Lama. Above this a small village named Enugar, since destroyed : a short distance inland from this Prék, since destroyed.

On the right bank of the river, immediately above the mouth of the Kangsa, there is a small village inhabited by traders above the Kota Lama "on the right bank," then Jumuwan. All these villages are situated in a plain of considerable breadth, bounded on either side by densely wooded hills and traversed by the river Pérak, which flows, generally speaking, from north to south. The river Pérak at Qualla Kangsa is 245 yards wide, and has a current varying from 2 to 5 miles per hour, according to the state of the river ; although not very deep, from 1 to 7 feet, the current is almost noiseless, and at night the river is as still as a lake. The bottom is fine sand at the centre, and coarse sand and shingle at the edges. The channel is continually shifting, and what is deep water one month will be a shoal the next.

#### River Pérak.

#### Navigable for large boats.

It is navigable for large native boats and steam cutters. Various kinds of fish, not unpleasant to eat, but very bony and foul feeders, are numerous. These are frightened into traps and captured by the Malays. The river is stated to have its origin in a lake somewhere to the east of, and in much the same latitude as, Penang. About 20 miles above Qualla Kangsa a succession of rapids commences, rendering navigation impossible, except for canoes beyond. The river is liable to heavy floods ; as an instance, on the 5th January, 1876, it rose to a height of fully 12 feet above ordinary level, the surface being covered with froth and debris of all sorts, numerous boats and rafts were carried away.

#### Quality of water.

The water is tolerably clear, and after settling a little, becomes quite clear and colourless, throwing down some fine sand. The temperature is pretty high, the water feeling almost tepid. It is very soft, but contains a larger amount of suspended organic impurity, having its source perhaps in faecal pollution, the river being the main sewer of the country. On both banks of the river, at short intervals, latrines are constructed on bamboo rafts, and all the inhabitants, great and small, make use of them.

#### Kangsa water.

The Kangsa water is cooler and clearer than the Pérak water, but is equally polluted by the inhabitants living on the banks.

#### Products of Pérak.

On both sides of the Pérak river, cocoa palms abound, but do not appear to be indigenous, as they are only to be found in the vicinity of habitations. Betel palms, coffee, sugarcane, Indian corn, paddy and bamboos grow freely. The mango, mangosteen, tamarind, custard-apple, guava, pine-apple, jack, dorian, and other tropical fruits are abundant. Forest trees of various kinds, and suitable for building purposes, cover the hills. Some of these trees, especially the Buttress tree, reach an enormous height. The ground not actually under cultivation is covered with dense jungle. In Laroot, indian-rubber, gutta-percha, copal, catechu, and other drug-producing trees are common.

As a rule the trees which grow on the hills do not thrive on the plains, and *vice versa*.

#### Animals.

Wild animals are pretty numerous. Tigers and leopards, of which the Malays have a superstitious dread, inhabit the hills. Wild dogs and cats of various kinds roam about at night, and others infest the river. Elephants of small size, tame and wild, are found, and the females breed in captivity, meeting the males in the jungle. The elephants are not fed, but are let loose in the jungle all night to pick up what they can find. Monkeys of various kinds keep up a perpetual chatter among the trees. Buffaloes, red and black, and goats are numerous, and so are dogs of the Pariah breed, and cats with stumps for tails. Oxen are imported into Laroot for draught purposes. There are no sheep. Vultures, hawks, kites and crows are plentiful, so are ducks and barn-door fowl. Wild geese, duck, teal, snipe, plover, jungle-fowl, and quail are abundant.

#### Minerals.

The hills are rich in minerals, especially tin, and mining to a limited extent is carried on by Chinese. Gold and silver are found, but the mineral resources of the country are still undeveloped. For example, the tin mines are simple

scratchings on the surface ; the native tin being washed out, the ore has not yet been disturbed.

Insect life revels in the damp warm atmosphere. Butterflies, beetles, ants, flies, mosquitoes, and sand-flies are great pests. The climate appears to be peculiarly favourable to reptile life ; snakes, innocent and venomous, from the boa-constrictor to the small water-snake, and from the ophiophagus elaps to the small viper ; lizards, from the huge iguana to the small wall lizard ; centipedes, scorpions, tortoises, are everywhere met with. The jungle is full of small leeches which draw blood freely, and, as a rule, the bites cause troublesome sores.

During the stay of the troops at Qualla Kangsa, although it was reported to be the driest season of the year, as compared with Lower Bengal even, the climate was decidedly moist and fogs very common. A northerly breeze would usually spring up in the early morning rather suddenly, lull towards 11 A.M., spring up again at noon, veering round to east and south in the afternoon, and die away towards evening. Rain, as a rule, came down in drenching showers, an almost daily occurrence among the surrounding hills. The sky was rarely quite free from clouds, the amount being greatest in the afternoon. As a rule the mornings were cool, even chilly if a northern breeze happened to blow, and the dew fall was very heavy. Towards noon, when the breeze lulled, the heat became very oppressive, and the temperature continued high till late at night. The highest temperature in the shade during January, 1876, was 90°, and the highest in the sun 121° ; the lowest temperature in the shade was 72°. The maximum range in the shade was 14°, the minimum 6°, and the average 11°·25. The average in the sun was 109°·24 ; average maximum in the shade, 86°·77 ; average minimum in the shade, 76°·22 ; and the average daily temperature in the shade during the month, 81°·99.

The highest temperature in the shade during February was 95°, the lowest 70° ; the maximum range was 23°, the minimum, 6°, and the average range was 17°. The average maximum temperature in the shade was 91°, the average minimum 73°, and the average daily temperature, 81°·2.

The highest temperature in the shade during 13 days in March was 93° ; the lowest temperature in the shade, 71° ; the maximum range in the shade was 19° ; the minimum, 7° ; and the average daily range, 13°·92. The average maximum in the shade was 87°·30 ; the average minimum, 73°·38 ; and the average daily temperature during the 13 days, 79°·55.

Rain fell on 13 different days during December, on 16 different days during January, on 14 different days during February, and on 8 different days during 13 days in March.

Thunder storms were pretty frequent but not severe, and of short duration.

The wind was very variable during the 24 hours, although every day was pretty much the same. As a rule, it would go right round the compass between morning and night. It came usually in puffs, and, except on one occasion the evening of the 28th February, when there was a tremendous squall accompanied with heavy rain and thunder, was never very strong.

In Pérak the rivers are the high roads or principal means of communication. Of these the river Pérak is the chief. Between the rivers there are numerous foot-paths through the jungle, and with the following exception are the only means of communication between the rivers. Between Teluk Kertang on the Laroot river, and Qualla Kangsa on the Pérak river, a road has been constructed having an average width of 15 feet. It has a total length of 23 miles, and is suitable for carts between Teluk Kertang and the Brapit Pass. A similar road has been constructed by Captain Speedy between Sampong and the Kota tin mines near the Residency.

Laroot is inhabited by Malays and Chinese, chiefly the latter. Pérak is for the most part inhabited by Malays. The Chinese found in Pérak work in the Kinta mines.

The Malay is of small stature, muscular and active in his movements, fond of the water, boating, fishing, hunting and dollars ; a goodly number of them smoke opium, a habit acquired no doubt from the Chinese. Cultivating the soil is an occupation they do not show any natural liking for. They are fond of music, dancing, and out-door sports, especially a kind of foot-ball. The ball is made of split rattan and is very light. A Malay kicks this into the air with the instep of the bare foot, another kicks it before it reaches the ground, and

Insect life.

Reptile life.

Climate.

Rain.

Temperature.

Wind.

Means of communication.

Laroot and Pérak inhabitants.

Malay inhabitants.

the object is to keep the ball up as long as possible. Some of the Malays are very expert at this game.

#### Dress.

The male dress consists of a black or checked handkerchief tied in a peculiar manner over the head, so that the ends stick out like horns; chiefs and heads of villages wear caps made of grass or embroidered cloth, a cotton or cloth jacket named a *baju*, a pair of trowsers either short or loose like those worn by the Chinese, or long and tight at the ankles; a piece of checked or plain coloured cotton, chiefly red, about 3 yards in length, with the ends sewn together, called a *sarong*. This is worn in a variety of ways like a petticoat, tight behind and gathered in folds in front, or as a wrap for the head and shoulders or loins, according to the dictates of fancy and the particular occupation the Malay may be engaged in.

The ordinary Malay does not require the services of a shoemaker, but some of the chiefs who have seen a little of civilized life at Singapore or Penang, affect white stockings and patent leather shoes, just like some of our Ayrian brethren in Lower Bengal.

#### Malay women.

The Malay women, as a rule, have flat faces and pug noses, and although they cannot boast of much beauty, a pair of sharp bright eyes give them an intelligent expression. They are not very dark-skinned, and their hair, which is black, they brush off the forehead and arrange rather neatly with the aid of pads, &c. They have no head-dresses, and although professed Mahomedans, as a rule do not consider it necessary to conceal their faces.

#### Dress.

The clothes of the poorer Malay women consist of two *sarongs*; one worn as a petticoat, the other as a wrap over the head and shoulders. Those who can afford it, wear in addition a tight-fitting long gown over the *sarong* called a *kobaya*. Some of the young women wear the jacket or *baju*; they manage to pass through life without shoes.

#### Pursuits.

Household duties employ part of their time, and during leisure moments those industriously inclined manufacture grass boxes and rugs, and do a little in the way of embroidery; but in the latter accomplishment they are much inferior to the women of India. They are of a gay disposition, and fond of music and sight-seeing.

#### Malay children.

The Malay children are lively and active, and not overburdened with clothes; when modesty calls for it, a pair of trowsers or a *sarong*, according to the sex, is sufficient. They take to the water freely, and are fond of assisting in the fishing operations.

#### Food.

The Malays live chiefly on rice, fish, fruit and condiments, and an occasional buffalo feast regales their hearts. They are eternally chewing betel-nut, &c.

#### Qualities.

In ordinary times their personal courage is not great, but when worked into a state of fanaticism they are regardless of life. When on the war-path they show themselves as kittle as possible, and always endeavour to attack when little or no hurt is likely to result to themselves. The present campaign has disabused them a good deal of their confidence in the defensive power of stockades, but they can make their way through the jungle like cats, and so close do they lie that they may be passed and repassed by numbers without being observed.

#### Weapons.

Their weapons are small pieces of ordnance, rifles and muskets of sorts, spears, krises, swords, and pointed bamboos named ranjows, which are stuck in the ground at an angle across footpaths and inflict great damage on bare feet.

Formerly they used a round shield made of rattan, but latterly they have lost faith in its powers of defence.

#### Ammunition.

For rifles they use Snider and other ammunition, and for the muskets large slugs and tin bullets moulded over pieces of glass or crockery. For the small ordnance they use round shot, and water-shells filled with tin.

The Malays are very bad shots, firing usually from the hip, but deadly with the spear when opportunity offers. They take great care of their spears and krises, and attach superstitious significance to certain marks on them. Moreover, in the manufacture of these weapons, some of them are very skilful.

#### Malays inter-marry.

#### Diseases.

The Malays intermarry greatly, and in consequence suffer considerably from scrofulous affections; they are very liable to malarious fevers, dysentery and diarrhoea. Many of them have marks of small-pox, and inoculation with small-pox is common. They are prone to skin diseases, chiefly eczema, itch,

psoriasis and foul ulcers, the latter often originating in leech bites. Their surgery is of the most primitive kind, and they are fond of irritants in the treatment of wounds. Superficial gunshot wounds they cauterize, and deep ones they leave to fate, and object to bullets being extracted. A few of them have a *little* faith in the value of medicines, but the great majority of them have recourse to charms. A curious custom exists among them in cases of dangerous illness, which are attributed to the influence of evil spirits. If they can remove the evil spirits they are all right; so with this object they construct a miniature *prahu* or war-boat of wood, complete in every way, with mast, rigging, black flag, paddles and rudder. The boat is filled with various articles—a bag of rice at the stern, and a lamp made out of a cockle-shell at the prow; the body of the boat is stuffed with cups made of leaves, containing liquors of various sorts; entrails of fowls, sweetmeats of kinds, tobacco, flowers and copper coins. The boat is supported by a slender square bamboo platform, surrounded with pendent grass, to the ends of which are tied all sorts of eatables, and at the corners the legs and wings of a chicken. About 18 inches below the boat are figures of turtles, crocodiles and lizards, made of rice, resting on a plantain leaf, the whole being supported by four straight branches about 7 feet high (the top leaves forming a canopy) stuck into a raft made of plantain trees. Slips of bamboo are stuck round the raft, with partially-burned red rags tied to them. The raft is set afloat, and it is supposed that the evil spirits, enticed away by the food in the boat, leave the patient and attach themselves to the boat. Should any Malay, by accident or otherwise, touch this raft after it has been set afloat, he or she becomes afflicted with the disease from which the person for whose benefit the raft was set adrift suffered.

Belief in charms.

The Chinese are numerous in Laroot, and are for the most part employed in the tin mines. A good many work at trades and keep stores.

Laroot Chinese.

They are clannish and quarrelsome, and the majority of them are addicted to opium-smoking. They work in gangs with head men over them, who are responsible for their good behaviour. The Chinaman lives well, the principal articles of his diet being rice, fish, pork, ducks, and tea. He is more industrious than the Malay, and when kept well in hand gets through a good deal of work.

The Chinese were very unmanageable as transport coolies, but imperfect organisation and defective supervision were probably the cause of this.

They are more healthy than the Malays, but suffer a good deal from malarious fevers.

They are not so liable to skin diseases.

When Brigadier-General Ross arrived at Qualla Kangsa, he fixed his residence in Inchi Midás Stockade, and Qualla Kangsa became the head quarters of the Laroot Field Force.

Topography of Qualla Kangsa.

A spur stretching towards the north-east from Inchi Midás Stockade was cleared of jungle, and huts for the European troops erected on it. The spur was about 60 feet at its highest part above the level of the river, and sloped down towards the river bank. The site of the huts was bounded on the north by the Kangsa and Pérak rivers, on the east by the Pérak river and a ravine, on the south by jungle, and on the west by Inchi Midás Stockade.

At the east side of the camp there was an old Malay stockade, part of which was utilised as a burying-ground for British troops.

Old Malay Stockade.

The surface soil at Qualla Kangsa was gravelly, with a substratum of clay.

The huts were constructed of a framework of wood with thatched roofs, and in some instances thatched sides and gables. The roofs were pretty watertight, and numerous apertures in the walls and at the eaves, together with openings to serve as doors, allowed of free ventilation; each man had an average cubic space of 260 feet. Bamboo platforms were constructed along each side of the huts and served as beds, raising the men about 2 feet off the ground. As temporary structures the huts answered fairly well, but they were hot during the day and damp and chilly at night, due no doubt to the proximity of a large river, and the frequent occurrence of fogs.

Huts.

Accommodation and arrangements for troops.

A small hut capable of accommodating twelve patients, was constructed of matting to serve as an hospital. I got the hospital servants to partition off a portion at the west end to serve as an office and dispensary, and erect a small

Hospital.

shed at the east end to serve as a lavatory and place for commodes. They also constructed twelve bamboo bedsteads, and a hut for the medical subordinates at the west end of the hospital.

The hospital was sufficient to accommodate all the sick till the beginning of January. An increase in the amount of sickness then occurring, necessitated part of one of the huts occupied by troops being brought into use. This was objectionable; but owing to the uncertainty of the movements of the force the General did not like to build fresh huts. A new hut, capable of accommodating 50 men, was constructed, however, and when this was completed and occupied a good hut was handed over for use as an hospital. A portion at the north end was partitioned off for an office, and a portion at the south end was divided off into lavatory, latrine and dispensary. Bamboo bedsteads were constructed; windows cut out of the walls, and fitted with shutters made of matting. The hospital having been made comfortable, was occupied on the 25th January.

#### Lighting.

There was accommodation for 32 patients, allowing an area of 66 feet, and a cubic space of 705 feet per bed. The ventilation was free, but in other respects it was similar to the huts occupied by the troops,—hot during the day and damp and chilly during the night. The huts occupied by the troops, and the hospital hut, were lighted at night by means of oil lamps, in accordance with the Indian camp scale.

#### Latrines.

Trenches were used in the first instance as latrines for both Europeans and Natives, dug to leeward of the camp. Latrines were afterwards constructed over the Pérak river; they were clean, free from smell, and answered the purpose well, without apparently polluting the water to a great extent, for the fish were in such numbers that the ordure was removed as soon as it reached the surface of the water.

#### Urinals.

To serve as urinals, narrow deep trenches were dug at convenient sites, and dry earth sprinkled over the urine twice a day prevented any offensive smell. They answered the purpose remarkably well.

#### Portable commodes.

For hospital use there were portable commodes with tin pans. The dry earth system was adopted; and although, owing to the number of bowel complaints the commodes were a good deal used, there was no offensive odour. The dry earth was stored under cover in old porter casks.

#### Camp refuse.

The camp refuse was collected in heaps and burned. A gang of 20 Chinese coolies, under the Provost Marshal, kept the camp clean; and, although there were a large number of natives, the sanitary condition of the camp was good. A few floggings convinced the natives that they could not commit nuisances with impunity, and as all the jungle had been rooted up, there was no cover to conceal filth.

#### Cooking.

Drains were dug round each of the huts to carry off the surface water, and as there was a good fall towards the river, the ground very soon dried up after rain.

Cooking was done under cover. Open sheds with thatched roofs were constructed, and protected from the sun and from rain as a rule. The cooking utensils were the ordinary tinned copper boilers and frying-pans in use in India, and permitted of boiling, stewing, and frying.

#### Tinning of pots difficult.

I am of opinion that copper cooking-pots are a mistake, especially on service, when they have a good deal of wear and tear. The tinning process is a serious drawback, especially where there are detachments at a distance from the tinning men. During the Pérak operations it was with the greatest difficulty the pots were even indifferently tinned, as tinsmiths instead of tinning men were sent with the force, and it was by the merest accident that a man who knew something about tinning was discovered. Strong block tin boilers are lighter to carry, and would in every way be superior on service to copper boilers. As a hospital kitchen, a hut was erected by the followers. The utensils were copper boilers for meat, &c., and enamelled saucepans for cooking arrowroot, &c.

Here again block-tin would be most suitable, as there was the same difficulty about tinning the boilers, and the saucepans were cumbersome and heavy.

#### Fuel.

Fuel for all purposes was brought in by fatigue parties of coolies from the jungle, and stacked near the kitchens. The wood burned well, and the supply was abundant.

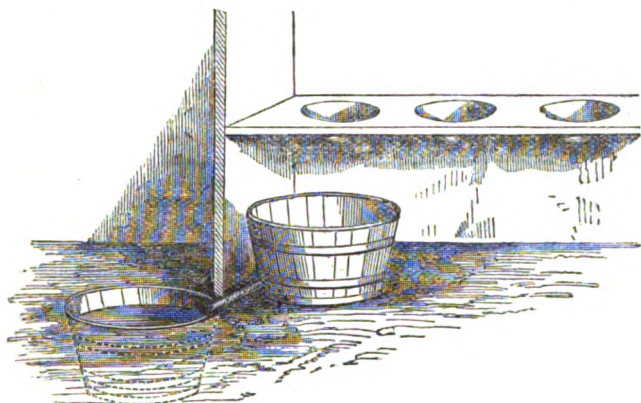


The means of ablution were not very refined, but answered the purpose very well. Porter casks cut in two made very good tubs, and these were kept full of water, with which the men washed their faces and hands. Lavatory.

There were voluntary bathing parades every evening under the orderly officer, and compulsory bathing parades at 7 A.M. once a week. Washing was done by the men in the Perak and Kangsa rivers as occasion required. The hospital clothing was washed by washermen, as in India. Bathing.

For ablution purposes the hospital was furnished with block-tin basins, and tubs made out of porter casks.

To remove waste water and to keep the lavatory dry, I had an empty tub inside the lavatory communicating by means of a bamboo tube with a tub sunk in the ground outside the lavatory, so :—



The outside tub was emptied by hand as occasion required, and the contents carried outside the camp.

The troops were rationed on the same scale as was adopted in Abyssinia : Rations. fresh meat,  $1\frac{1}{4}$  lb. ; bread,  $1\frac{1}{4}$  lb. ; or biscuit, 1 lb. ; sugar,  $2\frac{1}{2}$  oz. ; potatoes or yams, 1 lb. ; salt,  $\frac{1}{2}$  oz. ; tea,  $\frac{1}{2}$  oz. ; or cocoa, 1 oz. ; or coffee, 1 oz. After the 24th of January, salted beef and pork were each issued once a-week to the extent of 12 oz. per ration ; accompanying this issue there was a weekly allowance of 6 oz. pickles,  $\frac{1}{2}$  pint vinegar,  $\frac{1}{2}$  oz. mustard, and  $\frac{1}{2}$  oz. pepper. When tinned meat was issued instead of fresh meat, the allowance was 1 lb. per man. With the exception of a few days in the beginning of December, the fresh meat consisted of buffalo flesh. Several oxen were imported from Penang, but disease broke out among them, due, in my opinion, to the trying treatment the animals received, and it was not considered judicious to import more.

The buffaloes were of two kinds, black and red ; the latter being much more numerous than the former—both were used for food. Buffalo flesh has a peculiar sweetish flavour, and is extremely tough, coarse, and indigestible. With elaborate manipulation, seasoning, and great care in the cooking, it could be made palatable, but the limited means of cooking at the disposal of the troops would not admit of this. A good many men, under the impression that it caused diarrhoea, would not eat it.

The tinned meats, chiefly Australian beef and mutton, were occasionally issued ; their quality was, on the whole, good, but the troops were soon tired of them, as they had but little flavour, and all tasted alike.

The salted beef and pork were of fair quality and were well liked by the men as a change.

Biscuit was issued for a short time of very fair quality, and now and again to detachments, if there was no bakery. After a bakery was established at Qualla Kangsa, bread was issued there, and at Campong Boyah and Gapes as well. At first it was good, but latterly it fell off a good deal, owing to the flour

being gritty and damaged from damp. Australian and Indian flour separately or mixed were used in its manufacture.

The tea issued was China tea, of indifferent quality, a considerable proportion consisting of small stalks. The tea issued to the troops in India is much superior.

The coffee was issued raw, and as proper means for roasting and grinding were not available, it was not much used; moreover, the men had an impression that it caused diarrhoea. Cocoa in cakes was occasionally issued; the quality was fairly good and the troops liked it.

The sugar was of unequal quality, as a rule dirty and not to be compared with the sugar issued to the troops in India.

The salt, pepper, pickles vinegar and mustard were good.

The potatoes were good when fresh, but deteriorated after being kept a few days. The yams were rather coarse but wholesome. Some onions and pumpkins could be obtained by private purchase.

In the way of fruits,—plantains, cocoanuts, mangoes and guavas were within reach of the soldiers, but money was very scarce.

**Lime juice issued.** On the recommendation of Surgeon-Major Collis, 2 oz. lime juice and 1 oz. sugar were issued to the European troops twice a week after the 22nd December.

**Porter and rum.** Porter and rum were issued on alternate days, the daily ration being one pint of porter or one dram of rum. They were both of wholesome quality, and I believe their issue was beneficial. As it was extremely difficult to procure other liquor, intemperance was reduced to a minimum.

**Water.** The water for all purposes was obtained in the first instance from the river Pérak. A well 25 feet deep was afterwards sunk, and afforded a limited supply of water.

**River water.** The river water was slightly turbid on being drawn, but, after settling a little, became perfectly colourless and transparent, a sediment of mud or fine sand being thrown down. There was also deposited a perfectly colourless and transparent gelatinous slime which rapidly choked the filters; in other respects it was free from odour and pleasant to the taste.

**Well water.** The well water was from the surface chiefly; it was lazy when drawn and continued so after settling for some time. The haziness was due to fine particles of clay, and even after filtration was not entirely removed. It had a clayey odour and slight earthy taste. Both the river and well water were very soft. The river water was at first used in its natural state and appeared to be wholesome. In the beginning of January a Macnamara filter came to the front, and was at once brought into use. A second arriving shortly afterwards, a sufficiency of water for drinking purposes was filtered and used by the troops.

**River water boiled.** Two filters only having been sanctioned, the troops in the out-stations used unfiltered water. Dysentery becoming rather prevalent, large boilers were applied for, and four having been brought to the front, all the drinking water was boiled before being filtered. After the well was opened, one filter was used for well water and the other for boiled river water. After boiling and filtration the water was decidedly good.

**Clothing.** The clothing of the troops consisted of a serge suit and two suits of cotton drill dyed a khaki colour, helmet, Glengary cap, leather gaiters, woollen shirt and socks, cholera belts, Kilmarnock night caps and ammunition boots.

Taking into consideration the very limited time allowed for preparation, the clothing was as suitable as could be obtained, but in a very damp climate like that of Pérak, cotton drill, unless frequently washed and artificially dried, becomes damp and clammy. In the morning with the temperature below 80° and a cold breeze blowing, it was not sufficiently warm, and when put on in the morning felt damp and uncomfortable. For garrison life white cotton drill is suitable enough, but for jungle work woollen clothing would be better adapted. A light textured tweed of a darkish slate colour, with the cloth doubled and quilted at seat and knees of trousers and elbows of coat, where it is most apt to give way, would be comfortable and diminish the susceptibility to chill.

The leather gaiters were too hot, and when wet became soft and pulpy. Tanned canvas gaiters being porous, would be more suitable, and they would support the leg better than leather gaiters.

The helmets, Glengaries and Kilmarnock night caps were comfortable and suitable.

The ammunition boots did not give much wear.

In the way of bedding, the soldier had his great coat, a blanket and a waterproof sheet. As a rule these were sufficient, but there were times when an extra blanket would have been very acceptable.

Waterproof cloaks with hoods were provided for the sentries during rain.

Serge suits were worn on night duties after the 1st of February when considered advisable.

During the first half of December the troops were marching to the front Duties. through Laroot. After arrival at the various positions,—Qualla Kangsa, Campang Boyah and Gapes,—they were employed in clearing jungle, levelling ant hills and road making. Military duties were light.

I recommended that the working hours should be two hours in the morning and two hours in the evening; but the Commanding Royal Engineer stating that it was necessary that a clearing should be made as speedily as possible, the officers and men were employed from 6 A.M. to 5 P.M. every day, with an hour allowed for breakfast and an hour for dinner. As the exposure began to tell on the officers and men, Surgeon-Major Collis recommended, on the 28th December, that the working hours should be from 6 to 8.30 A.M., 9 to 11 A.M., and 3 to 5 P.M. This recommendation was acted on, but did not appear to be followed by the benefit anticipated. Towards the close of January, when the working hours were from 6 to 8 A.M. and 4 to 6 P.M., the improvement in the health was marked, and after the middle of February, when fatigue duties were only performed in the morning, the admissions to hospital were very few, and bowel complaints almost entirely disappeared.

In addition to the fatigue duties, the night duties became harassing after the Kota Lama affair on the 4th January, and continued so till the arrival of the Goorkhas on the 26th January.

The fatigue duties were occasionally interrupted by affairs with the Malays during January and beginning of February, and these had an enlivening influence on the men, and gave them something to talk about.

Certain work had to be performed at Qualla Kangsa and the other stockades in a short space of time, and, in consequence, it was considered necessary that the men should work during the heat of the day. This of course could not be accomplished with impunity to health, and although at first the exposure did not appear to be prejudicial to health, it was secretly influencing the system. The lesson taught was that in a similar climate, fatigue duties during the heat of the day should be avoided when practicable.

As the troops were daily under observation, routine health inspections were not made.

The sick transport consisted of doolies, dandies, elephants, carts with springs Sick transport. and carts without springs, and was under the supervision of the Assistant Quartermaster-General. When not required for doolies the dooly-bearers were employed as ordinary coolies; probably this could not be avoided, but the effect of it was that, when dooly-bearers were required for the sick, they were sent in a gang without being told off to doolies or sorted in any way. Had the dooly-bearers been under the supervision of the medical officers, they would have been paraded and told off to doolies in sets according to height, and so carry the doolies with comfort to the inmates. Doolies were only employed in carrying sick between Qualla Kangsa and the Laroot River. As a rule they stopped short at Bukit Gantang, carts being employed for the remainder of the journey.

The dooly used was the Morley-Collis dooley, with six bearers. The Morley-Collis material and workmanship of the doolies supplied were very inferior, and, in consequence, during every trip they were greatly damaged, and as a rule brought back in an unserviceable condition. Fortunately the Madras Sappers were at hand and able to repair them, otherwise, after the first trip they would have been useless. As to the merits of the dooly, when in motion on a smooth road, it is more comfortable than the old pattern army dooly. The raised portion of canvas to serve as a pillow is a decided improvement. The dooly can be packed up so as to be tolerably portable. It is not equal to the old army dooly when at rest, as the roof collapses to a certain extent, and if great care is

not taken, the end pieces of the dooly will fall against the inmate's head or feet. Care is required in adjusting the frame work of the dooly, so that the corner cords may not be too long nor too short. The second rings in the end pieces of the dooly intended for lowering the pole, so that the dooly may be raised higher, are practically useless, as it takes a long time to remove the pole and place it in the second rings, and when this is accomplished, the pole and the inmate's nose come into very undesirable proximity.

On a rough road, the play allowed by the end chains causes the bearers to stagger about, and they have great difficulty in keeping the dooly steady.

There is too much iron work about the dooly, and the number of screws, clasps, rivets, hooks, staples, pins, chains, &c., makes repair difficult after damage.

I have come to the above conclusions after having repeatedly seen the doolies return from moderate journeys, broken and unserviceable, and after having walked a distance of 14 miles over a rough road alongside six of them.

Dandies.

The dandies were always employed for jungle work, as the doolies were not at all suited for the work. They answered very well, although they were rather old and required looking after. They were rather short, as they were intended for hill work and for natives. Four bearers carried one easily.

A similarly constructed dandie, 6 feet long and 2 feet wide, with a blanket handy to throw over the pole to serve as a protection from the sun, would be the most suitable form for rough roads and jungle paths.

Elephants.

Elephants were not a comfortable mode of conveyance, chiefly because there was no proper place to sit on. An elephant could only carry two men with their rifles and accoutrements.

Carts.

The carts with and without spring, on account of inequalities in the road, jolted greatly and were only suited to convalescents. They were used between Bukit Gantang and the landing place on the Laroot river.

Hospital equipment.

The medicines, instruments, medical stores, and comforts were amply sufficient, and this although a third of the medicines and stores were not available until the return of the troops. It was a mistake to divide them into three lots, as one of the lots lay unused in the hold of the "Czarewitch" underneath Commissariat stores, and, when a few medicines were required in the treatment of bowel complaints, Surgeon-Major Collis applied to Penang in vain for a supply.

The medicines and appliances were packed in coarse boxes, with very inferior padlocks attached, and were not strong enough for the rough handling they got. In some cases there was some difficulty experienced in preventing the boxes from falling to pieces.

In any similar expedition I would recommend that all the reserve medicines and stores should be kept together and packed in substantial well made boxes, furnished with good strong padlocks, that field panniers and field companions should be available for detachments. The field pannier might contain a few more medicines, especially morphia and sulphate of zinc. It should be the duty of a medical subordinate to look after the medical supplies under instructions from the Principal Medical Officer, and attend to requisitions for medicines and appliances from medical officers in charge of detachments.

Medical trans-  
actions. The  
Buffs

By keeping all the medical supplies together, fewer boxes and less carriage would be required, a great matter when transport is obtained with difficulty.

As previously stated, a careful inspection of the European portion of the force was made before it left Calcutta.

On board ship and during the advance through Laroot to the Pérak river, the troops, although they had some hot and trying marches, enjoyed first-rate health. During the march, which occupied ten days, a three-grain issue of quinine was made every second day, but was stopped after Qualla Kangsa was reached, as a febrile tendency did not manifest itself among the men.

Quinine issue.

Surgeon-Major Collis commenced a daily issue of three grains of quinine on the 19th January, and after the 29th of the same month, this was continued on alternate days until the troops left the Malay Peninsula.

Towards the end of December, diarrhoea of a mild type, and usually lasting for 24 hours, became pretty prevalent among both officers and men, and now and again a case of dysentery and simple continued fever would come under treatment. Somewhat later on, in the beginning of January, dysentery and

diarrhoea of a severe type became prevalent, and strong-looking men were chiefly affected. Towards the end of January an improvement occurred, bowel complaints becoming less numerous and, at the same time, less severe. The chief cause in bringing about this change was no doubt reducing the number of working hours, so that the men were not exposed to the sun. Boiling the drinking water before filtration and the commencement of a quinine issue were no doubt of great benefit. It was a curious circumstance that subsequent to the commencement of a regular quinine issue, as bowel complaints decreased, malarious fever increased.

Although the mortality from bowel complaints among the native troops was comparatively speaking small, they suffered from them in even a greater degree than the Europeans. This was especially the case with the Madras Sappers and Miners, and the fact of no mortality occurring was probably due to the climate being pretty similar to the climate they had always been accustomed to.

The troops located in Pérak, at Qualla Kangsa, Campong Boyah, Gapes, Blanja and Kinta, all within a radius of 20 miles, as the climate, food and pursuits were the same, suffered about the same in degree and from similar complaints.

On the other hand two companies of the Buffs quartered at Malacca showed a great immunity from bowel complaints, and there was no mortality; further, the amount of sickness was trifling. The reason for such a difference is patent—light duty, comfortable quarters, no exposure to the sun, good food, and the midday heat tempered by a mild sea breeze.

After the middle of February there were very few fresh admissions, but such was the relaxing nature of the climate, that the cases under treatment made little progress towards recovery.

When bowel complaints were most prevalent in January, several patients were sent to Penang for change of air, but the result was not very beneficial, as the majority of them had afterwards to be invalided to England immediately on arrival in Calcutta, and one or two died.

Admissions for other diseases, besides fevers and bowel complaints, were not numerous, and it is worthy of remark that from the time the Buffs left Calcutta until they returned, there was not a single admission for venereal disease.

The officers living on the same food and under similar circumstances as the men suffered in an equal, if not a greater, degree, and from the same diseases.

The average strength of the service companies of the Buffs was 599. Of Statistics. this number 401 were distributed in Pérak, at Qualla Kangsa, Campong Boyah, Gapes, Blanja and Kinta, and 198 garrisoned Malacca.

The total number of admissions into hospital, from the 20th November, 1875, to the 27th March, 1876, was 137, being in the ratio of 21·71 per thousand for the period.

There were altogether 13 deaths, being in the ratio of 21·70 per thousand for the period.

Immediately after the return of the regiment to Calcutta, 17 men were invalided to England, being in the ratio of 28·39 per thousand.

The average daily sick was 14·82, and the average number of days per man in hospital was 3·16.

The great bulk of admissions was caused by fevers and bowel complaints, and except that the mortality was considerable, the total amount of sickness was not great.

*Simple continued fever* gave 25 admissions, pretty equally distributed over Simple continued fever. the whole period, being in the ratio of 41·73 per thousand for the period.

There was one death, being in the ratio of 1·66 per thousand.

There was a good deal of similarity in the symptoms of all the cases, and they corresponded pretty closely with those observed in mild ardent fever, such as occurs among young soldiers shortly after arrival in India. The symptoms were violent headache, flushed face and suffused conjunctivæ, coated tongue, and constipated bowels, great thirst and no appetite, full incompressible pulse. After about four days the symptoms would disappear somewhat suddenly, leaving the patient weak but convalescent. Many of the patients complained of pain and stiffness at the back of the head and neck after the acute symptoms disappeared.

In the fatal case of fever, the patient had been a good deal exposed to the sun as orderly cook. The fever was characterised by violent head symptoms, indicating considerable brain irritation.

Previous to death there was considerable twitching of the muscles of the face and extremities, the patient being at the time comatose.

The cause of these fevers was probably exposure to the sun followed by a chill.

*Malarious fevers* did not show themselves till February, and, curiously enough, after the troops had been taking quinine regularly for some time. The forms were quotidian and tertian, and yielded readily to large doses of quinine and stimulants.

There were altogether 10 admissions, being in the ratio of 16.69 per thousand. No deaths.

It is probable that the quinine issue, although it did not act as a prophylactic against malarious fevers, was useful in improving the general health, and thus diminishing the liability to bowel complaints.

The Goorkhas got no quinine as a prophylactic, and suffered in proportion, very slightly more than the Buffs from malarious fevers.

The two cases of *acute rheumatism* admitted belonged to the detachment at Malacca.

Of the four cases of *muscular rheumatism*, three occurred at Malacca and one at Qualla Kangsa. They were ordinary cases of lumbago.

One case of *heat apoplexy* occurred on board the hired steamer "Abyssinia," and was attributed to the man falling asleep with his head near a heated steam pipe. He made a good recovery.

One case of *spinal meningitis* was admitted to the field hospital at Banda Barru, and proved fatal the day after admission, he had been sent from Blanja suffering from dysentery.

The case of *brow ache* occurred at Malacca.

The case of *inflammation of inguinal glands* occurred at Malacca.

One case of *laryngeal catarrh* and one case of *bronchitis* occurred at Malacca.

The case of *pneumonia* occurred at Qualla Kangsa. The disease was limited to the lower two-thirds of the right lung, and for some time progressed satisfactorily, but, owing to the relaxing climate, the disease became chronic and destructive lung disease set in. The patient was invalided to England after arrival in Calcutta, and is reported to have since died.

Two cases of *dyspepsia* were admitted at Qualla Kangsa, and in all probability were due to indifferent food.

*Dysentery* was the scourge of the force in Pérak. Among the Buffs there were 42 admissions, being at the rate of 70.11 per thousand for the period, and five deaths, being in the ratio of 8.34 per thousand for the period.

In most cases the disease commenced with symptoms of ordinary diarrhoea, followed in two or three days by malarious fever, tenesmus, tormina, frequent grumous, slimy motions, loss of appetite and intense thirst. The tongue, at first coated and furred, became, in the chronic stage, preternaturally clear and red. In a day or two the skin would become moist without the dysenteric symptoms abating, and prostration rapidly sets in. There was no scorbutic tendency observed in any of the cases. It is probable that the colon rapidly became ulcerated, as profuse hemorrhage was a frequent occurrence, and in fatal cases was the immediate cause of death. During convalescence, relapses were frequent, indicating an altered condition of the bowel.

In one fatal case, great twitching of the muscles of the face and extremities preceded death, due, most likely, to eccentric irritation of the spinal cord.

As to treatment: Ipecacuanha in large doses, even when given in the earliest stage of the disease, without relieving the dysenteric symptoms, produced such prostration that it was unsafe to continue its use. In smaller doses, combined with opium, in the form of Dover's powder, it was of good service. In some of the cases, medicine did not appear to have the slightest remedial effect. The medicines relied on chiefly were Dover's powder and quinine, chlorodyne, tr. opii and quinine, morphia and quinine.

Stimulants had to be given at an early stage of the disease. Opiate enemata gave great relief when the gut was able to retain them.

The thirst was difficult to subdue, but drinks made of lime-juice and aromatic sulphuric acid and barley water appeared to be useful.

Malarious  
fevers.

Dysentery.

Symptoms.

Treatment.

When the disease became chronic, the tongue became clean and red, sometimes fissured, and the appetite was not satisfactory; pulse small and frequent, skin damp and clammy. When hemorrhage from the bowels occurred under such circumstances, the patient's chance of recovery was small, still, even after repeated hemorrhage, there were some wonderful recoveries.

It is probable that various agents contributed to the occurrence of dysentery. Causes. First, "climatic peculiarities"; a very moist atmosphere; temperature high, and heat rather oppressive during the day. Occasional puffs of a cool north breeze, a close evening followed towards early morning by a sudden fall in the temperature and the advent of a cold northerly breeze. Second, the proximity of a large river and the occurrence of morning fogs. Third, exposure to the sun with the body perspiring profusely under exertion, exciting a thirst that frequent and copious draughts of water only would allay. Fourth, the slime in the water of itself caused a tendency to diarrhoea. Lastly, indigestible food. These various agents acted on the system in such a manner that a chill was all that was required to excite morbid action; and as large quantities of cold water were swallowed daily, the bowels suffered.

When the working time was materially reduced, bowel complaints almost disappeared, and in producing this satisfactory change I have no doubt that boiling the water for drinking and the quinine issue assisted.

On the 7th February, 1876, half a company of the Buffs went to Blanja from Qualla Kangsa; they were free from sickness on arrival at Blanja, all the troops there were employed the greater part of the day in cutting jungle and erecting a palisade. Dysentery and diarrhoea became common. The working hours were then limited to two hours in the morning and two hours in the evening, with the result of removing the tendency to bowel complaints.

*Diarrhoea* gave 19 admissions into hospital, being in the ratio of 31.71 per thousand for the period, and three deaths, being in the ratio of 5 per thousand for the period. As a rule the diarrhoea was amenable to treatment, but in the severer cases, medicine did not have much effect. The symptoms were little or no fever; no tenesmus, furred tongue, intense thirst, no appetite, or the appetite not at all impaired. Motions very frequent and of a brown watery nature. In the serious cases the pulse would become very weak and the skin damp and clammy, and the profuse purging caused death by exhaustion. In one of the cases hemorrhage was the immediate cause of death. Diarrhoea.

The same agents were at work in causing the diarrhoea as in causing the dysentery.

One case of *right inguinal hernia* occurred. The subject of the injury was on the left bank of the river, at the attack on Kota Lama on the 20th January, and was trying to jump across a deep ditch in front of a stockade, when, missing his footing, he fell into the ditch, and I presume the weight of arms, ammunition and accoutrements assisted in causing the rupture.

One case of *colic* occurred at Qualla Kangsa. The subject was a strong muscular man who distinguished himself at the athletic sports on Christmas Day, and is supposed to have injured himself.

The bowels were not obstructed, but he had frequent bilious vomiting and, before death, became quite jaundiced. A circumscribed hardness, the size of a large orange, could be felt round the umbilicus; it was neither painful nor tender on manipulation. The constant vomiting and colicky seizures soon exhausted him and he died comatose. There were no febrile symptoms. The actual cause of death could not be ascertained, as there was no opportunity for holding *post mortem* examinations.

The two cases of *hepatitis* occurred at Malacca. One case invalided to England was admitted as simple continued fever.

The case of *abscess of the liver associated with dysentery*, occurred at Banda Banu; the patient was sent to Singapore where he died. I was unable to obtain any particulars about the case.

The two cases of *orchitis* occurred at Malacca, and the case of boil at Qualla Kangsa; there was nothing special about them.

The cases of *ulcer* occurred at Malacca.

Fortunately for the Buffs the Malays were very bad shots, for, although on several occasions exposed to their fire, and that within short ranges, only one Gun-shot man was hit. The unfortunate man was one of a working party cutting wood wounds.



at the south side of the camp at Qualla Kangsa on the morning of the 14th January, and was in the act of picking up a piece of wood to carry back to the camp when he was shot. The wound was caused by a large slug of semi-lunar shape, which penetrated at the middle of the left thigh in front, and came out immediately below the fold of left nates. Apparently no injury was done to bone or nerves and the hemorrhage was slight. The wound progressed satisfactorily, and there was every prospect of a good recovery. About a week after admission he showed symptoms of irritative fever, and in consequence, was sent to Penang for change of air. He died just before reaching Penang. The anterior wound had almost healed and the posterior wound was progressing favourably.

The case of *contusion* occurred at Qualla Kangsa.

The case of *fracture* occurred at Blanja and was caused in a curious manner. The subject was climbing a cocoa palm and had reached a height of about 7 feet when he was attacked so furiously by red ants that he was forced to let go hold of the tree, and, falling to the ground, sustained simple fracture of the left tibia and fibula. The fracture did well, but the patient afterwards becoming debilitated and showing a disposition to attacks of ague, was invalided to England immediately after arrival in Calcutta.

The admissions for *wounds* were caused by spears that had been captured. One accidentally dropped on the instep of a soldier's foot, just escaping the anterior tibial artery. These wounds did well.

The case of *poisoned finger* occurred at Kinta, and as the medical certificates only stated that it was accidental, I am unable to state the nature of the poisoning. The finger got all right.

The four cases returned as "*no appreciable disease*" had been under treatment at Penang for dysentery, but were discharged from the station hospital and sent to the troop-ship "*Himalaya*." As the "*Himalaya*" had to go back to the mouth of the Laroot river and would return to Penang in a few days, the captain, under the impression that the men were at the time suffering from dysentery, would not allow them to embark. They had to return to Penang station hospital, and hence the admissions "*no appreciable disease*."

Officers.

The average strength of the officers was 19, and out of this number seven were admitted to the sick list, being in the ratio of 368·42 per thousand for the period.

There were two deaths, being in the ratio of 105·26 per thousand for the period.

The case of *sunstroke* (heat-apoplexy) was that of Surgeon-Major Collis. He had just landed on the 9th December, and reached a village named Matang, one mile from the landing-place, when he was suddenly seized with faintness and became insensible. On recovering a little, he was sent by Surgeon Churchill, who attended him, to the steamer "*Arabia*," at the mouth of the Laroot river, and remaining there a few days, landed again and proceeded in a dooly to the front. Although far from well, he resumed duty as senior medical officer, and for some time his health improved; but a weight and weakness continuing in his left arm and leg, he went to Penang on medical certificate on the 31st January, and thence to Calcutta. He has since been sent to Mussoorie on medical certificate.

Major Morley had an attack of *iritis*, preceded by fever and slight rheumatic pains at Blanja, the result of a chill. The disease was limited to the right eye, and did not disappear until after arrival in India.

Lieutenants Ommanney and Armstrong, and Sub-Lieutenant Chippindall, were the subjects of *dysentery*. Lieutenant Ommanney became ill at Kinta, Lieutenant Armstrong at Qualla Kangsa, and Sub-Lieutenant Chippindall at Gapea. The three cases were very severe and relapses frequent. After return to India, on the recommendation of medical boards, Lieutenant Ommanney and Sub-Lieutenant Chippindall were invalided to England. Lieutenant Armstrong did not get beyond Penang; repeated attacks of hemorrhage from the bowels occurring, caused fatal exhaustion.

The fatal case of (*duodenitis*) *enteritis* was that of Lieutenant and Adjutant Colvill. On the evening of the 21st February, he exposed himself naked in a canoe for nearly an hour to a cool north breeze, and experienced a severe chill. The same night he had severe colicky pains and painful spasms of the stomach,



An emetic and warm water injection gave temporary relief. The stomach became very irritable, and there was pain and tenderness in the epigastrium.

The bowels were relieved by soap and water enemata. The vomiting became persistent, each act of vomiting being preceded by painful spasms of the stomach.

There was very little fever, but marked *hyperæsthesia*, and chloroform had to be frequently administered to give relief. As everything taken into the stomach was rejected, nutrient enemata were given, but the morbid action continuing, exhaustion set in and proved fatal on the night of the 29th February. Opiates in various forms were largely given, and local applications, sedative and soothing, but with only temporary benefit. Chloroform gave him most relief.

He had suffered from similar symptoms previously in India.

[The case of *spear wound* was that of Surgeon E. Townsend.

On the 4th January he accompanied the Buffs on the left bank of the river to Kota Lama, but getting separated from them was attacked by three Malays. The leader he shot dead with his revolver, but tripping, he fell, and the dead body of the Malay fell on the top of him. This saved him, as the two remaining Malays had barely time to wound him in the right arm and left leg before two blue jackets rushed up and saved him by shooting the Malays. The wound in the arm laid bare and injured the biceps muscle, the wound in the leg was only cutaneous. None of the spear wounds healed by the first intention.

Almost immediately after the arrival of the regiment at Cawnpore, several officers suffered from fever, and Captain Kelly had to be invalided to England in consequence of an attack of catarrh followed by dysentery. On the arrival of the regiment at Calcutta, 67 men were sent to Darjeeling for change of air, in addition to 8 married men, who with their families were sent to other hill stations.

General  
remarks.

A good many men suffered from the sun during the march to Howrah railway station, and the effects in several cases have not yet passed away. The regiment had scarcely reached Cawnpore when two men died of cholera, and a third has since died. One of the men left in Calcutta for Darjeeling died of cholera also.

A few days after reaching Cawnpore, the hospital became filled with cases of catarrh and fever, convalescence from which was very slow, due to the relaxing effect of the Pérak climate, and to the circumstance that the regiment did not have the benefit of a cold season, the temperature in Pérak in the cold season being as high as it is in Calcutta during the hot weather.

Now that the regiment has settled down, and from a judicious arrangement of duty on the part of the commanding officer, the health of the men shows marked improvement, but I anticipate that until the Buffs get a thorough change of climate, a high standard of health will not be attained.

I shall now append a few Tables to show the extent of sickness and mortality among the officers and men of the Buffs from the 20th November, 1875, to the 27th March, 1876, being the period during which the service companies of the regiment were absent from India.

TABLE I.—Admissions into Hospital and Mortality among the Buffs in the Malay Peninsula, from 20th November, 1875, to 27th March, 1876.

| Strength. | Fevers.   |       | Dysentery and Diarrhœa. |       | Other Diseases. |       | Wounds.   |       | Total.    |       |
|-----------|-----------|-------|-------------------------|-------|-----------------|-------|-----------|-------|-----------|-------|
|           | Admitted. | Died. | Admitted.               | Died. | Admitted.       | Died. | Admitted. | Died. | Admitted. | Died. |
| 599       | 25        | 1     | 61                      | 8     | 50              | 8     | 1         | 1     | 137       | 13    |

TABLE II.—Ratio of Admissions into Hospital and Mortality among the Buffs to strength per thousand, from 20th November, 1875, to 27th March, 1876.

| Average Strength. | Fevers.   |       | Dysentery and Diarrhœa. |       | Other Diseases. |       | Wounds.   |       | Total.    |       |
|-------------------|-----------|-------|-------------------------|-------|-----------------|-------|-----------|-------|-----------|-------|
|                   | Admitted. | Died. | Admitted.               | Died. | Admitted.       | Died. | Admitted. | Died. | Admitted. | Died. |
| 599               | 41·78     | 1·66  | 101·83                  | 13·35 | 83·47           | 5·0   | 1·66      | 1·66  | 228·69    | 21·67 |

TABLE III.—Admissions to the Sick List and Mortality among the Officers of the Buffs, from 20th November, 1875, to 27th March, 1876.

| Average Strength. | Sunstroke and Fevers. |       | Dysentery and Diarrhœa. |       | Other Diseases. |       | Wounds.   |       | Total.    |       |
|-------------------|-----------------------|-------|-------------------------|-------|-----------------|-------|-----------|-------|-----------|-------|
|                   | Admitted.             | Died. | Admitted.               | Died. | Admitted.       | Died. | Admitted. | Died. | Admitted. | Died. |
| 19                | 1                     | ..    | 3                       | 1     | 2               | 1     | 1         | ..    | 7         | 2     |

TABLE IV.—Ratio of Admissions to the Sick List and Mortality to strength per thousand among the Officers of the Buffs, from 20th November, 1875, to 27th March, 1876.

| Average Strength. | Sunstroke and Fevers. |       | Dysentery and Diarrhœa. |       | Other Diseases. |       | Wounds.   |       | Total.    |        |
|-------------------|-----------------------|-------|-------------------------|-------|-----------------|-------|-----------|-------|-----------|--------|
|                   | Admitted.             | Died. | Admitted.               | Died. | Admitted.       | Died. | Admitted. | Died. | Admitted. | Died.  |
| 19                | 52·63                 | ..    | 157·89                  | 52·63 | 105·29          | 52·63 | 52·63     | ..    | 368·41    | 105·26 |

TABLE V.—Showing the number of Officers and Men of the Buffs invalided to England after arrival in India, and the Diseases.

| Strength. |      | Fevers.   |      | Dysentery & Diarrhœa. |      | Other Diseases. |      | Wounds.   |      | Total.    |      |
|-----------|------|-----------|------|-----------------------|------|-----------------|------|-----------|------|-----------|------|
| Officers. | Men. | Officers. | Men. | Officers.             | Men. | Officers.       | Men. | Officers. | Men. | Officers. | Men. |
| 19        | 599  | ...       | 2    | 2                     | 12   | ...             | 3    | ...       | ...  | 2         | 17   |

TABLE VI.—Ratio of Invaliding to England among Officers and Men of the Buffs to strength per thousand.

| Average Strength. |      | Fevers.   |      | Dysentery & Diarrhœa. |       | Other Diseases. |      | Wounds.   |      | Total.    |       |
|-------------------|------|-----------|------|-----------------------|-------|-----------------|------|-----------|------|-----------|-------|
| Officers.         | Men. | Officers. | Men. | Officers.             | Men.  | Officers.       | Men. | Officers. | Men. | Officers. | Men.  |
| 19                | 599  | ...       | 3.33 | 105.26                | 20.03 | ...             | 5.00 | ...       | ...  | 105.26    | 28.38 |

In order to find out whether previous mode of life (especially with reference to abstinence from alcohol, and the use and abuse of that stimulant) had any influence on the admissions into hospital and mortality among the portion of the regiment employed in Pérak, I took some trouble to ensure the following Tables being as accurate as possible, from 4th December, 1875, to 10th March, 1876.

The detachment at Malacca is not included.

TABLE I.—Strength of Total Abstainers, Temperate and Intemperate Men of the Buffs in Pérak.

| Total Abstainers previous to leaving Calcutta. | Withdrew Pledges previous to leaving Calcutta. | Became Total Abstainers after leaving Calcutta. | Men of known Intemperate Habits. | Men who continued to be Total Abstainers. | Temperate Men. |
|------------------------------------------------|------------------------------------------------|-------------------------------------------------|----------------------------------|-------------------------------------------|----------------|
| 44                                             | 23                                             | 2                                               | 61                               | 21                                        | 294            |

TABLE II.—Admissions to Hospital and Mortality among the various classes whose strength is given in Table I.

| Classes.                |    | Fevers.   |       | Dysentery and Diarrhœa. |       | Other Diseases. |       | Wounds.   |       | Total.    |       |
|-------------------------|----|-----------|-------|-------------------------|-------|-----------------|-------|-----------|-------|-----------|-------|
|                         |    | Admitted. | Died. | Admitted.               | Died. | Admitted.       | Died. | Admitted. | Died. | Admitted. | Died. |
| Total abstainers        | .. | 3         | ..    | 6                       | 2     | 1               | ..    | ..        | ..    | 10        | 2     |
| Withdrew pledges        | .. | 2         | ..    | 5                       | ..    | 2               | 1     | ..        | ..    | 9         | 1     |
| Intemperate habits      | .. | 10        | ..    | 5                       | 1     | 2               | ..    | ..        | ..    | 17        | 1     |
| Since become abstainers | .. | ..        | ..    | ..                      | ..    | ..              | ..    | ..        | ..    | ..        | ..    |
| Temperate               | .. | 9         | 1     | 36                      | 5     | 11              | 2     | 1         | 1     | 57        | 9     |
| Total                   | .. | 24        | 1     | 52                      | 8     | 16              | 3     | 1         | 1     | 93        | 13    |

TABLE III.—Ratio of Admissions and Mortality among the various classes to strength per thousand.

| Classes.                       | Fevers.   |       | Dysentery and Diarrhoea |       | Other Diseases |       | Wounds.   |       | Total.    |       |
|--------------------------------|-----------|-------|-------------------------|-------|----------------|-------|-----------|-------|-----------|-------|
|                                | Admitted. | Died. | Admitted.               | Died. | Admitted.      | Died. | Admitted. | Died. | Admitted. | Died. |
| Total abstainers ... ..        | 142·85    | ...   | 285·71                  | 95·23 | 47·61          | ...   | ...       | ...   | 476·17    | 95·23 |
| Since become abstainers ... .. | ...       | ...   | ...                     | ...   | ...            | ...   | ...       | ...   | ...       | ...   |
| Withdrew pledges ... ..        | 86·95     | ...   | 217·39                  | ...   | 86·95          | 43·47 | ...       | ...   | 381·29    | 43·47 |
| Intemperate habits ... ..      | 163·93    | ...   | 81·96                   | 16·39 | 32·78          | ...   | ...       | ...   | 278·67    | 16·39 |
| Temperate ... ..               | 30·61     | 3·40  | 122·44                  | 17·00 | 37·07          | 6·80  | 3·40      | 3·40  | 193·52    | 30·60 |

According to the above tables, the total abstainers gave the greatest amount of sickness and mortality. Next come the men who withdrew their pledges. The men of intemperate habits give the lowest mortality, and come between the temperate men and the men who withdrew pledges as regards admissions into hospital. The men who became abstainers after leaving Calcutta give neither admissions nor deaths, but the number is too few to count for much.

The lesson to be learned from the above tables is, that on the whole, the temperate man has the best of it.

Statistics of  
Laroot Field  
Force.

5th Royal  
Artillery.

Headquarters,  
the Buffs.

Malacca de-  
achment,  
the Buffs.

Naval  
Brigade.

Madras  
Sappers.

Having completed the medical transactions of the Buffs, I shall now give a concise summary of the medical statistics of the "Laroot Field Force" during the operations in Pérak, from the 4th December, 1875, to the 10th March, 1876. As no information was obtained about the left half Battery, 3rd Battery, 5th Brigade, Royal Artillery, it is not included.

The average strength of the head quarters and right half Battery, 3rd Battery, 5th Brigade, Royal Artillery, was 33. Out of this number there were 13 admissions into hospital, being in the ratio of 393·93 per thousand. The admissions were caused chiefly by dysentery and diarrhoea, much of the same type as existed among the Buffs.

There was no mortality.

The head quarters and four companies of the Buffs stationed in Pérak, numbering 401, gave 93 admissions into hospital, being in the ratio of 231·90 per thousand, and 13 deaths, being in the ratio of 34·41 per thousand. The admissions were caused chiefly by fever, dysentery, and diarrhoea, the peculiarities of which have already been described.

Two companies of the Buffs, quartered at Malacca, having an average strength of 198, gave 27 admissions to hospitals, being in the ratio of 136·36 per thousand.

Fevers gave the greatest number of admissions, but, strictly speaking, there were no prevailing diseases.

There was no mortality.

The detachment at Malacca was as healthy as it would have been in any other part of the British possessions.

The Naval Brigade, with an average strength of 44, gave nine admissions into hospital between the 4th December, 1875, and the 11th February, 1876, being in the ratio of 204·31 per thousand for the period. The blue jackets suffered chiefly from dysentery and diarrhoea, and three of them were invalided and sent to their ship.

There were two deaths; one from spear wounds in the abdomen, the other killed in action at Kota Lama, the cause of death being a spear wound through the chest. The ratio of deaths per thousand was 45·45.

The Madras Sappers and Miners having a strength of 119 gave 94 admissions

into hospital, being in the ratio of 789·91 per thousand. The admissions were, chiefly caused by malarious fevers and dysentery.

They had no deaths.

The 1st Goorkha Light Infantry, out of an average strength of 460, gave 192 admissions into hospital, being in the ratio of 417·39 per thousand. The admissions were chiefly caused by fevers and dysentery. The 1st Goorkha Light Infantry.

At Sungie Ujong the health was very good, and sickness only increased after the arrival of the regiment at Qualla Kangsa, on the 26th of January, when the men were a good deal more exposed on fatigue and night duties.

There were five deaths; two from dysentery, two from gun-shot wounds and one from spear wound, being in the ratio of 10·88 per thousand.

The following tables will show the comparative amount of sickness and mortality:—

TABLE I.—Admissions into Hospital and Mortality among the Corps forming the Laroot Field Force, from 4th December, 1875, to 10th March, 1876.

| Corps.                         | Strength | Fevers.   |       | Dysentery and Diarrhoea. |       | Other Diseases. |       | Wounds.   |       | Killed. In action. | Total.    |       |
|--------------------------------|----------|-----------|-------|--------------------------|-------|-----------------|-------|-----------|-------|--------------------|-----------|-------|
|                                |          | Admitted. | Died. | Admitted.                | Died. | Admitted.       | Died. | Admitted. | Died. |                    | Admitted. | Died. |
| 3-5th Royal Artillery ...      | 33       | 2         | ...   | 7                        | ...   | 4               | ...   | ...       | ...   | ...                | 13        | ...   |
| { Head Quarters the Buffs ...  | 401      | 24        | 1     | 52                       | 6*    | 16              | 3     | 1         | 1     | ...                | 93        | 13    |
| { Detachment Malacca ...       | 19       | 7         | ...   | 1                        | ...   | 19              | ...   | ...       | ...   | ...                | 27        | ...   |
| Naval Brigades ...             | 44       | ...       | ...   | 7                        | ...   | 1               | ...   | ...       | 1     | 1                  | 9         | 2     |
| Madras Sappers ...             | 119      | 23        | ...   | 42                       | 28    | ...             | ...   | 1         | ...   | ...                | 94        | ...   |
| 1st Goorkha Light Infantry ... | 460      | 61        | ...   | 58                       | 2     | 68              | ...   | 5         | 3     | ...                | 192       | 5     |
| Total ...                      | 1,255    | 117       | 1     | 167                      | 10    | 136             | 3     | 8         | 5     | 1                  | 428       | 20    |

\* Includes one death on board ship after leaving Pérak.

† From 4th December, 1875, to 11th February, 1876.

TABLE II.—Ratio of Admissions to Hospital and Mortality per thousand among the Corps forming the Laroot Field Force, from 4th December, 1875, to 10 March, 1876.

| Corps.                         | Strength | Fevers.   |       | Dysentery and Diarrhoea. |        | Other Diseases. |       | Wounds.   |       | Killed in action. | Total.    |         |
|--------------------------------|----------|-----------|-------|--------------------------|--------|-----------------|-------|-----------|-------|-------------------|-----------|---------|
|                                |          | Admitted. | Died. | Admitted.                | Died.  | Admitted.       | Died. | Admitted. | Died. |                   | Admitted. | Deaths. |
| 3-5th Royal Artillery ...      | 33       | 60·60     | ...   | 213·33                   | ...    | 121·21          | ...   | ...       | ...   | ...               | 395·14    | ...     |
| { Head Quarters the Buffs ...  | 401      | 59·85     | 2·49  | 129·67                   | 19·95* | 39·90           | 7·48  | 2·49      | 2·49  | ...               | 231·91    | 32·41   |
| { Detachment* Malacca ...      | 198      | 35·35     | ...   | 5·05                     | ...    | 95·95           | ...   | ...       | ...   | ...               | 136·35    | ...     |
| Naval Brigades ...             | 44       | ...       | ...   | 159·09                   | ...    | 22·72           | ...   | 22·72     | 22·72 | 22·72             | 204·53    | 15·44   |
| Madras Sappers ...             | 119      | 193·27    | ...   | 352·94                   | ...    | 235·29          | ...   | 8·40      | ...   | ...               | 789·90    | ...     |
| 1st Goorkha Light Infantry ... | 460      | 132·82    | ...   | 124·56                   | 4·34   | 147·82          | ...   | 10·86     | 6·52  | ...               | 416·06    | 10·86   |

\* Includes one death on board ship after leaving Pérak.

† From 4th December, 1875, to 10th March, 1876.

## ARMY MEDICAL DEPARTMENT.

TABLE III.—Admissions to the Sick List and Mortality among Officers belonging to the Laroot Field Force, from 4th December, 1875, to 10th March, 1876.

| Corps.                   | Strength. | Sunstroke. |       | Fever.    |       | Dysentery and Diarrhœa. |       | Other Diseases. |       | Wounds.   |       | Killed in Action. | Total.    |         |
|--------------------------|-----------|------------|-------|-----------|-------|-------------------------|-------|-----------------|-------|-----------|-------|-------------------|-----------|---------|
|                          |           | Admitted.  | Died. | Admitted. | Died. | Admitted.               | Died. | Admitted.       | Died. | Admitted. | Died. |                   | Admitted. | Deaths. |
| Brigade Staff ..         | 5         | ..         | ..    | ..        | ..    | ..                      | ..    | ..              | ..    | ..        | ..    | 1                 | ..        | 1       |
| 3-5th Royal Artillery .. | 3         | ..         | ..    | ..        | ..    | 1                       | ..    | ..              | ..    | ..        | ..    | ..                | 1         | ..      |
| The Buffs ..             | 19        | ..         | ..    | ..        | ..    | 3                       | 1     | 2               | 1     | ..        | ..    | ..                | 5         | 2       |
| Royal Engineers ..       | 4         | ..         | ..    | 1         | ..    | 1                       | ..    | 1               | ..    | ..        | ..    | ..                | 3         | ..      |
| Naval Brigade ..         | 4         | ..         | ..    | ..        | ..    | 1                       | ..    | ..              | ..    | ..        | ..    | ..                | 1         | ..      |
| Army Medical Depart. ..  | 5         | 1          | ..    | ..        | ..    | ..                      | ..    | ..              | ..    | 1         | ..    | ..                | 2         | ..      |
| Madras Sappers ..        | 1         | ..         | ..    | ..        | ..    | 1                       | ..    | 1               | ..    | ..        | ..    | ..                | 2         | ..      |
| 1st Goorkha Light Infy.  | 9         | ..         | ..    | ..        | ..    | 2                       | ..    | ..              | ..    | ..        | ..    | ..                | 2         | ..      |
| Total ..                 | 50        | 1          | ..    | 1         | ..    | 9                       | 1     | 4               | 1     | 1         | ..    | 1                 | 16        | 3       |

TABLE IV.—Ratio of Admissions to the Sick List and Mortality per thousand among Officers of the Laroot Field Force from 4th December, 1875, to 10th March, 1876.

| Corps.                   | Strength. | Sunstroke. |       | Fevers.   |       | Dysentery and Diarrhoea. |       | Other Diseases. |       | Wounds.   |       | Killed in Action. | Total.    |         |
|--------------------------|-----------|------------|-------|-----------|-------|--------------------------|-------|-----------------|-------|-----------|-------|-------------------|-----------|---------|
|                          |           | Admitted.  | Died. | Admitted. | Died. | Admitted.                | Died. | Admitted.       | Died. | Admitted. | Died. |                   | Admitted. | Deaths. |
| Brigade Staff ..         | 5         | ..         | ..    | ..        | ..    | ..                       | ..    | ..              | ..    | ..        | ..    | 200·00            | ..        | 200·00  |
| 3-5th Royal Artillery .. | 3         | ..         | ..    | ..        | ..    | 333·33                   | ..    | ..              | ..    | ..        | ..    | ..                | 333·33    | ..      |
| Royal Engineers ..       | 4         | ..         | ..    | 250·00    | ..    | 250·00                   | ..    | 250·00          | ..    | ..        | ..    | ..                | 750·00    | ..      |
| The Buffs ..             | 19        | ..         | ..    | ..        | ..    | 157·89                   | 52·63 | 105·26          | 52·63 | ..        | ..    | ..                | 263·15    | 105·26  |
| Naval Brigade ..         | 4         | ..         | ..    | ..        | ..    | 250·00                   | ..    | ..              | ..    | ..        | ..    | ..                | 250·00    | ..      |
| Army Medical Depart. ..  | 5         | 200·00     | ..    | ..        | ..    | ..                       | ..    | ..              | ..    | 200·00    | ..    | ..                | 400·00    | ..      |
| Madras Sappers ..        | 1         | ..         | ..    | ..        | ..    | 1000·00                  | ..    | 1000·00         | ..    | ..        | ..    | ..                | 2000·00   | ..      |
| 1st Goorkha Light Infy.  | 9         | ..         | ..    | ..        | ..    | 222·22                   | ..    | ..              | ..    | ..        | ..    | ..                | 222·22    | ..      |

## Meteorological Observations at Qualla Kangsa, for the Month of January, 1876.

| Date.      | Temperature in Shade. |       | Range. | Average Daily Temperature. | Temperature in Sun at 2 P.M. | Direction of Wind. | Remarks on the Weather.                                 |
|------------|-----------------------|-------|--------|----------------------------|------------------------------|--------------------|---------------------------------------------------------|
|            | 7 A.M.                | Noon. |        |                            |                              |                    |                                                         |
| 1st..      | 75                    | 86    | 14     | 83.83                      | 103                          | N.                 | Fine day, rain at night.                                |
| 2nd..      | 76                    | 85    | 9      | 79.33                      | 94                           | N.                 | Cloudy day, rain at night.                              |
| 3rd..      | 75                    | 83    | 8      | 79.33                      | 98                           | N.                 | Cloudy morning, rainy afternoon                         |
| 4th..      | 75                    | 85    | 10     | 78.66                      | 96                           | N.S.E.             | Cloudy morning, rain all night.                         |
| 5th..      | 76                    | 88    | 12     | 82.66                      | 111                          | N.S.E.             | Morning fine, afternoon rain.                           |
| 6th..      | 75                    | 86    | 11     | 82.00                      | 121                          | N.                 | Morning foggy, thunder and rain at 6 P.M.               |
| 7th..      | 74                    | 85    | 14     | 82.33                      | 118                          | N.                 | Morning very foggy, evening fine.                       |
| 8th..      | 75                    | 88    | 13     | 80.66                      | Rain                         | N.S.E.             | Morning fine, noon rain, evening fine.                  |
| 9th..      | 77                    | 87    | 84     | 82.33                      | 112                          | N.                 | Morning foggy, afternoon rain.                          |
| 10th..     | 75                    | 87    | 85     | 82.33                      | 111                          | N.                 | Morning fine, mist on hills, evening fine.              |
| 11th..     | 77                    | 86    | 86     | 83.00                      | 113                          | N.                 | Morning fine, evening shower of rain.                   |
| 12th..     | 76                    | 85    | 82     | 81.00                      | Rain                         | N.W.               | Morning foggy, raining among hills, day squally.        |
| 13th..     | 75                    | 84    | 83     | 80.66                      | 106                          | N.W.               | Morning fine, evening fine.                             |
| 14th..     | 74                    | 86    | 83     | 81.00                      | 117                          | N.                 | Morning fine, evening fine.                             |
| 15th..     | 72                    | 85    | 83     | 80.00                      | 118                          | N.S.E.             | Morning foggy, evening shower.                          |
| 16th..     | 76                    | 86    | 90     | 84.00                      | 117                          | N.                 | Morning cloudy, rain during the night.                  |
| 17th..     | 75                    | 87    | 88     | 83.33                      | 115                          | N.                 | Morning foggy, evening fine.                            |
| 18th..     | 77                    | 89    | 87     | 84.33                      | 118                          | N.                 | Morning fine, evening cloudy.                           |
| 19th..     | 76                    | 88    | 87     | 83.66                      | 108                          | N.S.E.             | Morning fine, evening heavy rain.                       |
| 20th..     | 77                    | 87    | 86     | 88.33                      | 115                          | N.W.               | Morning fine, evening heavy rain.                       |
| 21st..     | 78                    | 89    | 88     | 85.00                      | 116                          | N.                 | Fine all day.                                           |
| 22nd..     | 77                    | 83    | 82     | 80.66                      | 98                           | N.                 | Morning fine, afternoon cloudy.                         |
| 23rd..     | 76                    | 84    | 83     | 81.00                      | 94                           | N.E.               | Morning fine, evening cloudy.                           |
| 24th..     | 78                    | 88    | 86     | 84.00                      | 120                          | N.                 | Night close, day cloudy and close, evening fine.        |
| 25th..     | 77                    | 89    | 87     | 84.33                      | 116                          | N.W.               | Morning foggy, day cloudy, evening lightning in E.      |
| 26th..     | 75                    | 88    | 86     | 86.33                      | 118                          | N.S.E.             | Night close, morning foggy, rain at noon, evening fine. |
| 27th..     | 74                    | 88    | 83     | 85.00                      | 96                           | N.S.E.             | Morning foggy, evening fine.                            |
| 28th..     | 73                    | 89    | 84     | 82.00                      | 97                           | N.S.E.             | Morning fine, afternoon rain, evening fine.             |
| 29th..     | 77                    | 85    | 83     | 81.66                      | 103                          | N.                 | Morning cool and cloudy, afternoon rain, evening fine.  |
| 30th..     | 75                    | 86    | 78     | 79.00                      | 108                          | N.                 | Morning raw and foggy, afternoon showery, evening fine. |
| 31st..     | 75                    | 88    | 74     | 79.00                      | 111                          | N.                 |                                                         |
| Average .. | 75.23                 | 86.77 | 84     | 82.10                      | 109.24                       | N.S.E.             |                                                         |



Meteorological Observations at Qualla Kangas, for the month of February, 1876.

| Date.      | Temperature in Shade. |        |        |        | Range. | Average Daily Temperature. | Direction of Wind. | Remarks on the Weather.                                            |
|------------|-----------------------|--------|--------|--------|--------|----------------------------|--------------------|--------------------------------------------------------------------|
|            | 6 A.M.                | 9 A.M. | 2 P.M. | 7 P.M. |        |                            |                    |                                                                    |
| 1st..      | 72                    | 83     | 88     | 79     | 16     | 80.5                       | N. & E.            | Morning cloudy, noon rain, evening fine.                           |
| 2nd        | 71                    | 85     | 89     | 80     | 18     | 81.2                       | N.                 | Morning foggy, afternoon rain, evening fine.                       |
| 3rd..      | 74                    | 84     | 87     | 79     | 13     | 80.0                       | N.E. S.E.          | Fine all day.                                                      |
| 4th..      | 72                    | 84     | 89     | 80     | 17     | 81.2                       | N.                 | Fine all day.                                                      |
| 5th..      | 74                    | 85     | 87     | 79     | 13     | 81.2                       | N.                 | Morning foggy, evening fine.                                       |
| 6th..      | 71                    | 86     | 89     | 80     | 18     | 81.5                       | N & E.             | Morning rain and foggy, evening fine.                              |
| 7th..      | 72                    | 88     | 95     | 78     | 23     | 83.2                       | N. E. N.           | Morning foggy, day cloudy, evening fine.                           |
| 8th..      | 72                    | 86     | 90     | 77     | 18     | 81.2                       | N. E. N.           | Morning fine, afternoon heavy rain.                                |
| 9th..      | 71                    | 76     | 88     | 79     | 17     | 78.5                       | N. E. N.           | Morning foggy, day fine.                                           |
| 10th..     | 70                    | 77     | 91     | 81     | 21     | 79.7                       | N. V.              | Morning foggy, day fine, evening cloudy.                           |
| 11th..     | 71                    | 78     | 91     | 81     | 20     | 80.2                       | N. N.W.            | Morning fine, afternoon cloudy, evening rain.                      |
| 12th..     | 74                    | 79     | 92     | 83     | 18     | 82.0                       | N. V.              | Morning fine, afternoon cloudy, evening squally.                   |
| 13th..     | 74                    | 79     | 91     | 81     | 17     | 81.2                       | N. S. W.           | Morning fine, afternoon cloudy, evening rain.                      |
| 14th..     | 76                    | 80     | 90     | 80     | 14     | 81.5                       | N. V.              | Morning fine, afternoon cloudy and squally.                        |
| 15th..     | 74                    | 80     | 91     | 79     | 17     | 81.0                       | N. V.              | Morning rain and foggy, afternoon cloudy and squally.              |
| 16th..     | 74                    | 80     | 92     | 77     | 18     | 80.7                       | N. V.              | Morning rain and foggy, afternoon cloudy, evening rain.            |
| 17th..     | 72                    | 76     | 90     | 78     | 18     | 79.0                       | N. V.              | Morning rain and foggy day cloudy.                                 |
| 18th..     | 73                    | 80     | 93     | 79     | 20     | 81.2                       | N. V.              | Morning foggy, afternoon rain, evening cloudy.                     |
| 19th..     | 76                    | 82     | 92     | 82     | 16     | 83.0                       | N. V.              | Morning foggy, day hot and close, evening cloudy and close.        |
| 20th..     | 77                    | 82     | 94     | 83     | 17     | 84.0                       | N. V.              | Morning foggy, day hot and close, evening cloudy and close.        |
| 21st..     | 74                    | 81     | 94     | 80     | 20     | 82.2                       | N. S. W.           | Morning fine, afternoon cloudy, evening rain.                      |
| 22nd       | 74                    | 81     | 92     | 81     | 18     | 82.0                       | N. S. W.           | Morning fine, evening cloudy.                                      |
| 23rd..     | 74                    | 81     | 92     | 82     | 18     | 82.2                       | N. V.              | Morning foggy, heavy clouds in the evening.                        |
| 24th..     | 74                    | 81     | 95     | 78     | 21     | 82.0                       | N. V.              | Morning fine, afternoon thunder and rain.                          |
| 25th..     | 76                    | 81     | 83     | 80     | 6      | 79.7                       | N. S. W.           | Morning foggy, afternoon cloudy, evening rain.                     |
| 26th..     | 75                    | 83     | 92     | 77     | 18     | 81.7                       | N. V.              | Morning fine, afternoon cloudy, evening rain.                      |
| 27th..     | 74                    | 82     | 93     | 78     | 19     | 81.7                       | N. S. W.           | Morning cloudy, afternoon cloudy, evening rain.                    |
| 28th..     | 72                    | 78     | 93     | 78     | 21     | 80.2                       | N. S.              | Morning foggy, afternoon thunder with rain, and tremendous squall. |
| 29th..     | 74                    | 80     | 95     | 78     | 21     | 81.7                       | N. V.              | Morning cloudy, afternoon cloudy, evening rain.                    |
| Average .. | 73                    | 81     | 91     | 79     | 17     | 81.3                       | N. V.              |                                                                    |

Meteorological Observations at Qualla Kangsa, from 1st to 13th March, 1876.

| Date.      | Temperature in Shade. |        |        |        | Daily Range. | Average Daily Temperature. | Direction of Wind. | Remarks on the Weather.                               |
|------------|-----------------------|--------|--------|--------|--------------|----------------------------|--------------------|-------------------------------------------------------|
|            | 6 A.M.                | 9 A.M. | 2 P.M. | 7 P.M. |              |                            |                    |                                                       |
| 1st..      | 75                    | 82     | 90     | 78     | 15           | 81.2                       | N. V.              | Morning cloudy, afternoon cloudy.                     |
| 2nd..      | 74                    | 81     | 93     | 79     | 19           | 81.7                       | N. V.              | Morning cloudy, afternoon rain, evening rain.         |
| 3rd..      | 71                    | 79     | 83     | 75     | 12           | 77.0                       | S. S. W.           | Morning cloudy, afternoon cloudy, evening heavy rain. |
| 4th..      | 74                    | 80     | 83     | 76     | 9            | 78.2                       | E. N. W.           | Morning cloudy, afternoon rain, evening rain.         |
| 5th..      | 75                    | 80     | 82     | 75     | 7            | 78.0                       | N. V.              | Raining all day.                                      |
| 6th..      | 74                    | 79     | 80     | 76     | 6            | 77.2                       | V.                 | Morning cloudy, afternoon and evening rain.           |
| 7th..      | 72                    | 76     | 79     | 76     | 7            | 75.7                       | N. V.              | Morning raw and foggy, showery all day.               |
| 8th..      | 74                    | 79     | 91     | 81     | 17           | 81.2                       | N. V.              | Morning cloudy, slight rain, afternoon fine.          |
| 9th..      | 74                    | 80     | 93     | 78     | 19           | 81.2                       | N. V.              | Morning fine, afternoon fine, evening heavy rain.     |
| 10th..     | 73                    | 79     | 90     | 83     | 17           | 81.2                       | N. S. W.           | Morning cloudy, day clear and hot.                    |
| 11th..     | 75                    | 80     | 92     | 82     | 17           | 82.2                       | N. S. W.           | Fine all day, but hot.                                |
| 12th..     | 72                    | 78     | 90     | 80     | 18           | 80.0                       | N. S. W.           | Fine all day, but hot.                                |
| 13th..     | 71                    | 77     | 89     | 79     | 18           | 79.0                       | N. V.              | Fine all day, and cool.                               |
| Average .. | 73.38                 | 79.23  | 87.30  | 78.30  | 13.92        | 79.43                      | N. V.              |                                                       |

As the accommodation for sick in the station hospital at Penang was limited, and preparation had not been made for an influx of sick from Pérak, the propriety of utilizing the "Czarewitch" as a hospital ship at the mouth of the Laroot river was taken into consideration, and at the request of Brigadier-General Ross I submitted the following suggestions:—

Qualla Kangsa, 5th February, 1876.

1. The part of the ship between decks in front of the main hatch should be set apart for a hospital.
  2. The whole of this space should be cleared of all bulkheads and other obstruction of a temporary nature.
  3. Cots should be slung fore and aft at a height of about three feet from the deck, and there should be an allowance of 150 superficial feet to each cot.
  4. The ventilation should be as complete as possible by means of shafts, windsails, scuttles, and hatches with extra apertures if necessary.
  5. Two waterclosets should be constructed for dysenteric cases,—one on each side of the ship.
  6. A space should be set apart under the awning on the deck, and arranged so that cots could be slung when deemed necessary by the medical officer.
  7. A space should be set apart for the kits and clothes of the sick, which could be kept clean and readily fumigated.
  8. A space should be set apart for a laundry.
  9. A space should be set apart for cooking and the utensils in ordinary use in India should be employed.
  10. A contrivance should be arranged for raising and lowering sick from the main to the spar deck, and *vice versa*, when necessary.
  11. Fumigation and lime washing between decks should be frequent, and great cleanliness enjoined.
  12. Distilled water only should be used for cooking and drinking purposes, the condensing apparatus should therefore be in good order.
  13. The Commissariat Department should be prepared to supply on board the "Czarewitch" carbolic acid, Condyl's fluid, and lime.
- Hospital bedding and clothing for 20 patients, and the following provisions :  
Bread, mutton, fowls, eggs, milk (fresh or preserved), butter (if procurable), potatoes, vegetables, barley, rice, sago, arrowroot, flour, essence of beef, tea, sugar, salt, port wine, brandy, sherry, bottled porter and lime juice.
14. The following hospital establishment will be necessary :—1 medical officer; 1 subordinate medical officer; 2 European orderlies; 1 compounder; 2 ward coolies; 2 cooks; 1 water carrier; 2 sweepers.
  15. Purveyor's establishment should be proportionately arranged by the commissariat officer.
  16. Land transport should be arranged so that at least six sick could be carried to the landing place weekly.
  17. All arrangements should be complete, and establishments in place before any sick are sent on board.

(Signed)

G. S. DAVIE, M.D., Surgeon-Major,  
Senior Medical Officer, Laroot Field Force.

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NOTE.—Owing to the uncertainty of the movements of the force and other causes, the "Czarewitch" was not utilized as a hospital ship, and sickness having abated, it was not necessary to forward more sick to Penang.

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The following suggestions to aid the Buffs in preserving their health were published in regimental orders, on board the "Arabia," on the 23rd November, 1875:—

1. Drink some tea or coffee and eat a bit of biscuit the first thing in the morning. Fill your water bottles with cold tea.

2. Drink only such water as is issued. Carefully abstain from well or pond water casually met with. As a rule stagnant and muddy water is bad.

3. Eat only ripe fresh fruits well known to be wholesome in India, and such as you have been accustomed to.

4. Stimulants should not be taken till the fatigue of the day is over, and should be diluted with hot or cold tea. Half an hour before the rum issue a dose of quinine should be taken, and arrangements will be made for a quinine issue.

5. When dry clean straw is available, sleep on it in preference to sleeping on the ground.

6. After exertion take the earliest opportunity of changing shirts and socks, at the same time washing the body or dry rubbing it, by so doing you will prevent a chill. Chills are very dangerous and to be carefully guarded against. Should no opportunity offer for changing the clothes, the great-coat should be thrown over the shoulders, so as to let the body cool gradually.

7. A clean skin is very conducive to health, and every opportunity for bathing parades should be taken advantage of.

8. Blistered feet are to a great extent prevented by soaping or oiling the feet well before starting on a march.

9. It is of the greatest importance to be able to sleep under cover at night, and in the absence of tents or other shelter, waterproof sheets may be utilized in a variety of ways, so as to protect from dew and emanation from the ground.

10. Cholera belts should be constantly worn and changed when the shirts are changed.

11. If there is no opportunity of washing shirts, cholera belts, and socks, they should be well dried in the sun, beaten with a stick, and then shaken.

12. Should the feet get wet, the earliest opportunity should be taken to change the socks, and foot-sore men should report themselves as soon after a march as possible.

13. If you feel out of sorts, and especially if you have any bowel complaint, report sick at once, as by doing this, you will have a good chance of not being detained in hospital for treatment.

(Signed) G. S. DAVIE, M.D., Surgeon-Major,  
in Medical charge, the Buffs.

Surgeon-Major W. Collis, the Buffs, has desired me to append the following:—

*Rules for Medical Officers accompanying the Perak Field Force.*

1. Each medical officer will carefully look after the health and comfort of the men in his charge, and at once report any unusual occurrence to the principal medical officer.

2. Medical officers on detached duty will particularly look after arrangement of the camps, the source and purity of the water, the supply to the troops, the ventilation of the tent, the cleanliness of the men, and the general conservancy arrangements of the camp.

3. At regular intervals on the line of march, and always before going into action, medical officers will muster their doolie bearers, and register the names of the men appointed to each doolie. They will be good enough to instruct these men as to the duties they are expected to perform. One bheestie will accompany the medical officers, while the others keep their places in the column.

4. On the line of march, or previous to going into action, if the medical officer finds any deficiency in the medical comforts, surgical instruments, or hospital necessities, he will at once report the matter to the "Principal Medical Officer," and at the same time send an indent for these articles necessary to complete his equipment.

5. In sending a patient to the rear or next hospital, the medical officer will send with the wounded or sick men a brief account of the nature of the wound, injury or disease, and the treatment he has adopted.

The accompanying form to be used :—

| Name _____ |           |     |                                      |                                                                               |
|------------|-----------|-----|--------------------------------------|-------------------------------------------------------------------------------|
| Date.      | Regiment. | No. | Wound, Injury, or Disease.           | Treatment.                                                                    |
|            |           |     | Gun-shot Wound of Thigh, Upper Third | Bullet extracted.<br>Bandage.<br>Hæmorrhage, nil.<br>Stimulants administered. |

NOTE.—The object of this is obvious. The second medical officer at once sees the opinion of the officer who first saw and examined the man, and knows what has been done and what further ought to be attempted.

6. On the order of the "Principal Medical Officer," quinine will be served out daily at sunset to the troops under the superintendence of the medical officers. This may be given either in lime juice or in rum according to circumstances.

Rules are separately supplied to the force, and medical officers will exercise a general supervision, and instruct the men under their charge as to the proper carrying out of these instructions.

(Signed) W. COLLIS, Surgeon-Major, the Buffs.  
P. M. O., Laroot Field Force.

Head Quarters, Camp, Qualla Kangsa,  
December, 1875.

#### *Draft of Rules for Men to observe while employed in Camp or Field.*

1st. All diseases or affections, no matter how trivial, must be at once reported to the officer in medical charge of the column or detachment. These affections, although, in themselves, possibly trivial or apparently mild, in a tropical climate, if not at once attended to, may become serious.

2nd. It is of the utmost importance for the health of the troops that no man should sleep on the ground. Any one by placing wood or other materials under his bed or hammock can ensure a full current of air beneath his body.

3rd. Dysentery and other diseases are constantly produced in hot climates by the practice of men sleeping in wet clothes or exposing themselves to draughts of air while sweating; consequently soldiers are strictly cautioned against exposing themselves at night.

4th. Unless actually necessary, soldiers should not sleep outside their huts or tents.

5th. It being generally the opinion in India that drinking water, unless pure, is a common cause of disease, soldiers are particularly cautioned against using, under any circumstances, any water other than that which is provided for them. For the same reason, food, especially pork, other than that provided in their rations, should not be eaten.

This rule also applies most strictly to fruits, or any berry or root, which in most instances are poisonous, that may be met with on the line of march.

A common cause of men falling out on the line of march has, in every campaign, been owing to sore feet caused by a hard-pressing shoe. This may be entirely prevented by the following simple plan :—Before commencing the march, rub freely the inside of the boot with fat or oil and then put it on, now rub well the outside of the boot also.

This not only prevents foot soreness, but in cold weather keeps the feet warm.

If the boots get wet, never dry them at a fire or in the sun, but stuff them with dry grass and let them dry gradually, then rub well with oil or fat.

6th. For the maintenance of good health, it is absolutely necessary that the skin of the body should be kept clean.

This can be easily accomplished by bathing if a sufficient quantity of water can be obtained, and if not, by simple dry rubbing.

7th. If possible, the same shirt or clothes which were worn during the day should not be slept in at night. In India and malarious climates it is considered that fever may be prevented or cut short by a daily dose of quinine. This will be attended to by the officers in medical charge, but soldiers should see that they get their supply.

8th. It has been proved beyond doubt that those soldiers who, in any campaign, are most abstemious as to spirituous liquor, enjoy the best of health. As a daily ration of rum sufficient will be served out, soldiers are particularly cautioned against using or partaking of any country liquor as they go along, and most particularly as in many instances this has found to be purposely poisoned.

(Signed) W. COLLIS, *Surgeon-Major, the Buffs,*  
P. M. O., *Laroot Field Force.*

Head Quarters, Camp, Qualla Kangsa,  
December, 1875.

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Concluding  
remarks.

In concluding this report, I may state that the number of medical subordinates attached to the force was quite equal to all the duties required.

With the exception of the cooks, the native hospital establishment was quite sufficient. There should have been at least four cooks.

The number of medical officers was as limited as it could well be, and as three out of five were on detached duty and one invalided, there was very little margin left for sickness; fortunately the medical officers were healthy, and performed all the duties required of them, but there should have been two additional surgeons with the European portion of the force.

(Signed) G. S. DAVIE, M.D., *Surgeon-Major. A.M.D.,*  
Cawnpore, 23rd May, 1876. *S. M. O., Laroot Field Force.*

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## APPENDIX No. IX.

## BHAMO TO MANWYNE.

By W. J. CHARLTON, Surgeon, A.M.D.

In giving a short description of the country, its people, and productions, through which we marched, I will first begin with Bharno, as it was here we disembarked on the 3rd of May, to begin our march to Manwyne in Yunan.

Bharno is a wretched squalid village, lying along the left bank of the Irrawaddy 1,000 miles from its mouth and 500 feet above sea level, composed of two parallel rows of miserable bamboo houses with a partially ill-paved brick street, about one mile in length, running between them. A spiked bamboo stockade surrounds it, and at either end of the street is a large gate, which is closed every evening at dusk, and is not opened till daylight next morning.

These defences are necessary protections against raids from tigers, cheetahs, and leopards which are said to infect the neighbourhood, but especially against the wild men—Kakhyans—who inhabit the mountains called by the same name, which run north and south close to Bharno and form the natural barrier between Burma and China.

Outside the northern gate lies the "Presidency," fenced round with a stockade and guarded by a force of 20 Sikhs. Here it is that the British official lives. Immediately outside his domicile are a few huts that the Kakhyans occupy temporarily when they descend to Bharno, from their mountain homes, for commercial purposes. The Bharnotes regard them with so much dread that they will not allow them to remain inside the town after the shutting of the gates.

The population is a mixed one, of Burmans, Chinese, and Shans; the Burmans and Shans occupying one end, and the Chinese the other end of the town. They are governed by a Burma official, styled a "Woondouk," who is responsible for the correct administration of the place to the Court of Mandalay.

This official is, like all other native officials in Upper Burmah, a thorough despot, and, with a due regard to his own interests, "squeezes" every individual under his jurisdiction whom he thinks able to pay up. This epithet "squeezing," must not be accepted in its literal sense, it is a term used in Burmah, and I dare say in many other places, to denote the moral pressure brought to bear on the people by native officials.

With such an administrator as this it is not to be wondered at that the people are wretchedly poor, the land uncultivated, and no spirit of enterprise shown.

This applies, I understand, to all Upper Burmah—corruption reigns throughout the land from the King down to the lowest Tsilkay (magistrate), each official doing his utmost to enrich himself while his term of office lasts.

Merely the skeleton of a former trade exists; what little is done, is done by the Chinese who export bales of raw cotton, which comes up from Mandalay, across the mountains on mules to Yunan; worked cottons, silks, and hardware are also sent, but raw cotton is the main export.

From 20 or 25 years ago, it is said that a trade of 500,000*l.* annually was done between Bharno and China, now I suppose it does not reach 10,000*l.*, and as Yunan has been almost depopulated by the late Panthay rebellion, the prospect of England, and especially Manchester, establishing a productive trade route in this direction, at present does not look bright.

In future years, if a population springs up in Yunan, the idea may be

entertained with good prospects of success, as this province, as well as Upper Burma, are known to be rich in mineral wealth.

The country around Bhamo and up to the base of the Kakhyan hills, is undulating and thickly covered with low jungle wood, tall grass, and forest trees. No cultivation is seen, except small patches of rice and tobacco, around Bhamo and a few other villages, and none is grown save what is absolutely necessary for the people's own individual wants.

Our march from Bhamo to the Sekaw base of hills lay along a narrow path in this jungle, part of the way running parallel to the Tapeng, a river which flows down from the Kakhyan mountains and empties itself into the Irrawaddy, three miles above Bhamo. On two occasions we crossed it on bridges of boats, each crossing causing a good deal of delay. The distance to Sekaw is about 20 miles, but two marches were made of it, the first being to Halone, an intermediate village on right bank of Tapeng; this place and Sekaw have a mixed population like Bhamo, occupying separate portions of the villages, and like it and for similar reasons have stockades and gates. A magistrate (tsilkay) resides in each, who is subordinate to the Woondouk of Bhamo. The country around Tekaw is much more open than around Bhamo, it has a rich alluvial soil, seemingly the deposit of centuries, carried down by the Tapeng; luxuriant grass and rice crops flourish in this limited area, and the cattle seemed fat and well favoured, giving excellent milk; tigers, cheetahs, and leopards, as well as peafowl and small deer (derai), were said by the natives to abound.

Many of the officers went out shooting, and bagged snipe, wild duck, and two or three varieties of teal.

The Chinamen who live here are all engaged in trade, selling pork, salted fish, and salt. The latter commodity is a very precious article in the estimation of the Kakhyans who buy large quantities of it. I believe there is nothing they appreciate so much.

From Sekaw our march lay through the mountains to Manwyne. These mountains are an off-shoot or spur of the Himalayas running directly north and south, and forming, as I previously said, the natural barrier between Burma and China, though, to speak more correctly, the boundary is at the "Nam Pong Choung," nearly 20 miles inwards in the hills from Sekaw. They are mostly composed of limestone and granite, out of which flows water as sparkling as crystal and refreshingly cool. From base to summit they are in most instances covered with fine, tall, straight trees of various kinds, the chief being pines. Crowds of beautiful orchids are seen clustered along trunk and branches. A good deal of undergrowth is interspersed. The highest point crossed was Pey-see-Toh (White Stone) 5,400 feet above sea level, and here white raspberries, blackberries, white camellias, and the dog-rose flourished in abundance. There are four different paths leading from Bhamo across these mountains into Yunan. Each one is a rugged steep and rocky track, along which men and mules are obliged to go in single file, although the mules usually carry from 175 lbs. to 200 lbs. in weight, nevertheless they ascend these difficult paths better than men, certainly far better than British soldiers and sepoy, perhaps not better than the Kakhyans. During the wet season these paths become small mountain streams most difficult to cross. The Kakhyans, or, as the people of the plains call them, the "wild men," who inhabit these mountains, are a peculiar and interesting race of people, whose real history is, I believe, not known, but they are supposed not to have inhabited these mountains long, and to have migrated from the north towards Tibet. They are but few, leading a gregarious life, having their villages sparsely scattered through the mountains. A person may travel many miles and not meet one. The village system is, no doubt, adopted for its greater safety, and for their mutual protection, as, being by nature robbers and plunderers, their hands are against every man, and every man's hand against theirs.

In appearance they are somewhat taller than the Burmese, square, thick-set and muscular, copper-coloured, with Mongolian features, long black hair twisted into a lump on top of head, and fastened with a turban. No trace of tattooing or semblance of pig-tail, though having the Chinese bordering them closely on one side and the Burmese on the other. They are pleasing and jovial, inquisitive, independent, impulsive, superstitious, and remarkably dirty,



so much so that it is said they never wash, and once they put on a suit of clothing, they let it find its own way off. The men's dress consists of a loose blue calico coat ornamented with cowries; a few distinguished individuals wear on the breast a Victoria Cross in the shape of a portion of tiger's jaw with a few teeth in; this has been gained by the individual himself in some deadly contest, and he naturally wears it with pride as bearing testimony to his pluck and valour. A loose blue calico trowser is worn as far as the knee, and some wear on lower part of leg a calico gaiter. Just beneath the knee they wear several rings of hempen cord; for what purpose it is intended I do not know, unless it be for ornament.

Every man is armed to the teeth with a *dak* slung over the shoulder, a flint musket of the rudest construction, a powder horn, and a spear. Beyond his village no Kakhyan moves unless armed, and in this manner they always go down to the plains when business brings them. Even to market he goes thus accoutred.

The women are, if anything, wilder-looking in expression than the men, and also wear blue calico cloth for their apparel, which consists of a neat jacket with short sleeves, adorned with red ribbon and 4-anna pieces; a loose skirt, embroidered at the bottom with silk; and around the waist and leg several coils of hempen cord. The married women wear a head-dress consisting of several folds of blue cloth neatly wound round and round in the shape of an inverted cone, from 1 foot to 1½ feet in height. On the top of this are several ornamental discs of silver.

The unmarried go bareheaded, having their front-hair cut straight across the forehead after the fashion seen sometimes among English girls; the back-hair is also cut short. As a rule, they are exceedingly ugly, though they have been described as beautiful; they in no way captivated the admiration of Tommy Atkins, who I positively heard ridiculing their good looks to a brother comrade. Both married and unmarried wear in their ears a small cylinder of silver, about 2 inches in length, with a broad piece of red tape hanging from the anterior end down to the shoulder. Though light copper-colour in complexion, still a rosy hue of health is discernible.

The sites for their villages are generally well chosen, being some well-cleared grassy spot amid the mountains, with sloping sides to carry down all water and refuse, so that the ground around is always quite dry and clean. In all cases sparkling streams of cool water flow close by.

Each house is a substantial, long building, from 60 to 70 feet in length, by about 25 to 30 in breadth, lofty, and raised 3 or 4 feet above the ground, built of strong posts, with enormously thick thatch of rice straw. There is but one entrance, which is at end of the house. Here the roof projects about 12 or 15 feet, and is supported by massive wooden pillars, on which are nailed for ornament or otherwise the heads and horns of deer and buffalo—a standing testimony to their skill with gun and cross-bow.

Generally may be seen under this portico nearly all the household squatted and in conversation, the women spinning yarn (coloured). Each house is divided into several compartments, holding many families. The only cultivation to be seen is rice on the hill sides. In the village may be seen buffaloes, pigs, ducks, geese, and chickens.

Unfortunately for themselves they are a notoriously drunken race, consuming large quantities of *Samshu*, a clear and very intoxicating spirit, which they distil from rice. Like all savages they are very superstitious, believing in nats (demons). In every village may be seen numerous bamboo posts with several wicker baskets attached to them. In these are placed the fowls, rice, and other offerings which are given to propitiate the nats. No pagoda or trace of the Buddhist religion is seen once the plains are left. They have a custom that all riders shall dismount on entering a village, and not mount again till he has passed through. It was requested that we would conform to this, but such we did not do, as, however inclined we might be to be courteous, still we knew that the experience of former expeditions was loss of power by deferring in any way to these people, who in their ignorance ascribed all deference to weakness and cowardice. *Tsanbwas* (chiefs) rule over certain portions of these mountains, and derive an income from dues levied on all merchandise passing through their territory; where they think it

is possible to get it they exact black mail. They make their bargains beforehand, and one of these worthies tried to do so with us, but was informed that if he got anything it would not be till we had returned to Bhamo, and then it depended on the treatment we had received in passing through.

Robbery is very common, but fortunately for us we lost nothing of the large amount of Government stores, &c., we had with us. This may be attributed to the careful arrangements made by the Commanding Officer for the protection of the-convoy; also to the fact that everything was done by us in an authoritative manner, which inspired the Kakhyans with a wholesome dread of us, as they saw plainly we would not tolerate any nonsense. Although they had never seen British troops before, still it was manifest by their behaviour that they had a healthy dread and respect for them. Why such should be the case it is difficult to say, but it may be perhaps that they have heard the Chinese and Burmese speak with respect (*sic*) of the "Foreign Devils."

From these mountain toils and pleasures we descended to Manwyne, the frontier Chinese Shan town. It is a wretched village (although Col. Sloden writes about the city walls), built of mud brick houses, situated between two ranges of the mountains on a fertile plain 70 miles in length, beginning at Momein, and having a breadth of 3 to 4 miles. The Tapeng is to be seen meandering through it. Elevation is about 3,400 ft. above sea level. The population is mostly Shan, who appear to be an industrious set of people, cultivating neat vegetable gardens and fields of rice, and breeding cattle, pigs, and poultry. The head official is an old widow of 70 years, who has occupied her present proud position since the death of her husband a few years back. Some of the officers thought they would pay her a visit, and, in conformity with the etiquette of the Manwyne Court, sent an intimation to this effect. The old lady sent back her best salaam to say she would be very glad to see them, and at the appointed hour they called at the palace, which is very little better than any other house in the place. They were ushered into a small verandah and accommodated with chairs, when presently the old lady made her appearance, attended by four hideous Shan maids of honour; she bowed to all, and sat down. Cups of tea, without milk or sugar, together with plantains, were passed round; then began a desultory conversation through the medium of an interpreter, the maids of honour and courtiers standing around with open mouths and gaping eyes. The old lady was perfectly reticent as to the object that brought us to Manwyne, never for a second alluding to it.

The day we marched in here the whole population—men, women, and children—turned out *en masse* to see us, and evinced the keenest curiosity in scrutinizing us and our property. They were, I understand, exceedingly struck with the coincidence of the Grosvenor party coming all the way from Peking, and the escort from an opposite country and direction, and meeting within a day of each other in Manwyne. This fact utterly puzzled them, and at once taught them that we are a people who work under a great organisation, and that they are not beyond our reach should circumstances ever arise to require our presence.

Though no one was punished for poor Margary's murder, still our presence at Manwyne will, I dare say, have a healthy effect for some years at least. Looked in as they are in their mountain homes, they probably imagined that they were inaccessible to the "Foreign Devils"; now they have learned a different lesson, and I hope it may be for their future welfare. The costumes of both men and women are almost identical with that of the Kakhyans. In every particular, save that of language, there is much similarity between these two people.

Market days are held regularly, when large numbers of Shans, Chinese, and Kakhyans may be seen buying and selling.

All money transactions are effected in the copper coin of China, called "change," of which between 400 or 500 go to the rupee. These coins are generally strung on cord, and in this fashion are carried about in the hand.

Among the commodities I saw exhibited for sale were pork, geese, ducks, chickens, snails just fresh from the streams, rice, grain, dried figs, raspberries, camelias (with which the ladies adorn their hair), cottons, silk, cutlery, matches, powder-horns, flint-guns and daks.

The powder is of their own manufacture, and necessarily of a vile description. Nothing a Kakhyan appreciates so much, except perhaps a bottle, as some good English powder. In exchange for empty bottles the men bought plenty of fowls and eggs, and in one instance, I am informed, went so far as to eat 48 of the latter.

The province is rich in minerals ; so much so that in the bazaars may be seen gold, silver, copper, tin, antimony, jade, and amber.

Our presence caused everything to rise considerably in price, as is generally the case where Englishmen go. Every one was anxious to bring away some memento of the place, whether it was dak, spear, powder-horn, pipe, or ladies' ear ornaments.

On this account our presence seemed to be appreciated, as they reaped a good harvest by us, which is, I presume, an uncommon thing in Manwyne ; still there seemed to be a certain uneasiness among them with regard to us, not correctly understanding our notions or intentions, and no doubt a sigh of relief was given as they saw the last of our heels.

Our Commanding Officer treated them, on one of the days we spent there, to a display of military manœuvres, and if one is to judge by the astonishment depicted on the countenances of the multitude at each action of the troops, I should say they thought us greater foreign devils than ever. Strolling one market day through the bazaars, I saw a son of Esculapius practising his profession in the following fashion. First I must mention he was a young Shan of about twenty-five years of age, a shrewd cunning looking fellow : well, this medico stood in a prominent place in the market, having beside him a looking-glass and box of therapeutics. Several people consulted him, and the examination of every individual took the same form ; first he or she was obliged to look into the glass while Dr. Shan pulled down the lower eyelid to let them see where part of the seeds of disease lay, then with a small rule he measured the length of each finger, also length and breadth of the palm, all this being done with an air and manner indicative of profound knowledge. By this examination the disease was diagnosed, and the patient received some nostrum from the infallible box, Dr. Shan receiving in turn so many change.

While on this subject, I may mention that the chief diseases of the place are small-pox—nearly a third of the people seem pitted—itch, scrofula, goitre, ague.

I saw several large goitres, but have been informed by the Grosvenor party that about Manwyne it does not seem to be nigh so prevalent as further on in the province towards Moneim and Talipoo ; they neither saw nor heard of cretins. The goitre is no doubt due to the hard water coming through the limestone and granite which abound in the mountains. As soon as the people knew that I was a medical man, many of them came to consult me for scrofulous ophthalmia, and dyspepsia due to opium eating and smoking.

After a rest of three days in Manwyne, we gladly commenced our return journey, passing by the hot spring, in some rice-fields, where poor Margary was murdered, also the Banyan tree on which his head was exposed to the vulgar gaze.

(Signed) W. J. CHARLTON, Surgeon, A.M.D.

## APPENDIX

## Annual Abstract of Meteorological Observations

GIBRALTAR.

Lat. 36° 6' N.

| Month.           | Mean Pressure. | Air Temperature. |        |              |          |           |      |           |      |           |      | Tension of Vapour. | Relative Humidity. |      |      |
|------------------|----------------|------------------|--------|--------------|----------|-----------|------|-----------|------|-----------|------|--------------------|--------------------|------|------|
|                  |                | Hourly Means.    |        | Daily Means. |          | Means of. |      | Abs. Min. |      | Abs. Max. |      |                    | Minimum.           |      |      |
|                  |                | 9 a.m.           | 9 p.m. | Simple.      | Reduced. | Min.      | Max. | Temp.     | Day. | Temp.     | Day. |                    | Mean.              |      | Day. |
|                  |                |                  |        |              |          |           |      |           |      |           |      |                    |                    |      |      |
| January ... ..   | 30.145         | 52.9             | ...    | ...          | ...      | 48.1      | 60.0 | 40.0      | 9th  | 65.0      | 7th  | 296                | 74.3               | 36.0 | 5th  |
| February ... ..  | 30.150         | 57.5             | ...    | ...          | ...      | 52.4      | 65.6 | 46.0      | 7th  | 71.4      | 18th | 311                | 73.5               | 57.6 | 10th |
| March ... ..     | 30.051         | 59.3             | ...    | ...          | ...      | 53.4      | 66.4 | 47.0      | 24th | 75.0      | 1st  | 369                | 73.0               | 57.9 | 6th  |
| April ... ..     | 30.037         | 62.4             | ...    | ...          | ...      | 55.9      | 70.2 | 47.0      | 15th | 77.5      | 25th | 373                | 66.4               | 39.5 | 15th |
| May ... ..       | 29.971         | 65.6             | ...    | ...          | ...      | 60.9      | 74.6 | 56.0      | 12th | 79.8      | 23rd | 433                | 72.0               | 54.5 | 26th |
| June ... ..      | 30.039         | 70.1             | ...    | ...          | ...      | 66.4      | 78.7 | 61.3      | 10th | 82.0      | 23rd | 554                | 74.6               | 59.4 | 13th |
| July ... ..      | 30.050         | 76.5             | ...    | ...          | ...      | 70.9      | 85.1 | 63.0      | 3rd  | 95.0      | 25th | 680                | 74.2               | 49.0 | 25th |
| August ... ..    | 30.097         | 78.0             | ...    | ...          | ...      | 72.9      | 86.1 | 60.0      | 17th | 97.6      | 24th | 743                | 77.0               | 57.0 | 24th |
| September ... .. | 30.026         | 75.0             | ...    | ...          | ...      | 67.9      | 83.9 | 62.0      | 15th | 90.7      | 1st  | 666                | 76.0               | 50.5 | 13th |
| October ... ..   | 29.951         | 67.1             | ...    | ...          | ...      | ...       | 74.6 | ...       | ...  | 84.3      | 5th  | 520                | 79.0               | 60.0 | 14th |
| November ... ..  | 30.006         | 62.4             | ...    | ...          | ...      | 57.3      | 71.0 | 50.0      | 6th  | 75.5      | 1st  | 490                | 86.8               | 67.5 | 3rd  |
| December ... ..  | 30.015         | 56.6             | ...    | ...          | ...      | 53.1      | 63.2 | 46.0      | 21st | 72.5      | 1st  | 415                | 92.2               | 79.2 | 10th |
| Mean ... ..      | 30.039         | 65.3             | ...    | ...          | ...      | 59.9      | 73.3 | 48.2      | ...  | 80.1      | ...  | 495                | 77.0               | 55.6 | ..   |

MALTA.

Lat. 35° 53' N.

|               |        |      |     |     |     |      |      |      |      |      |       |     |      |      |
|---------------|--------|------|-----|-----|-----|------|------|------|------|------|-------|-----|------|------|
| January ...   | 30.173 | 57.1 | ... | ... | ... | 52.9 | 60.1 | 44.8 | 2nd  | 64.8 | 10th  | 373 | 79.3 | 69.0 |
| February ...  | 30.080 | 58.0 | ... | ... | ... | 53.2 | 62.1 | 47.8 | 16th | 69.8 | 19th  | 393 | 81.0 | 70.0 |
| March ...     | 29.912 | 60.0 | ... | ... | ... | 54.2 | 63.2 | 44.2 | 21st | 69.0 | 25th  | 414 | 80.2 | 67.0 |
| April ...     | 29.941 | 63.6 | ... | ... | ... | 57.5 | 67.4 | 53.4 | 10th | 74.0 | 15th  | 493 | 83.8 | 68.2 |
| May ...       | 29.951 | 70.1 | ... | ... | ... | 62.7 | 74.1 | 57.0 | 2nd  | 82.0 | 14th  | 564 | 76.1 | 48.2 |
| June ...      | 29.917 | 73.1 | ... | ... | ... | 66.4 | 76.6 | 61.4 | 4th  | 83.0 | 24th  | 625 | 76.6 | 61.2 |
| July ...      | 29.970 | 78.3 | ... | ... | ... | 71.7 | 82.2 | 69.0 | 3rd  | 88.0 | 25th  | 726 | 74.6 | 57.2 |
| August ...    | 29.988 | 81.5 | ... | ... | ... | 75.1 | 85.2 | 72.0 | 28th | 90.4 | 25th  | 802 | 74.8 | 59.2 |
| September ... | 30.001 | 79.7 | ... | ... | ... | 73.3 | 83.0 | 65.8 | 16th | 91.0 | 1.1th | 767 | 75.7 | 58.0 |
| October ...   | 29.954 | 73.9 | ... | ... | ... | 67.5 | 76.5 | 60.0 | 31st | 85.0 | 1st   | 629 | 74.9 | 59.0 |
| November ...  | 29.950 | 64.4 | ... | ... | ... | 58.8 | 67.5 | 54.0 | 3rd  | 73.0 | 16th  | 465 | 76.5 | 68.0 |
| December ...  | 29.971 | 62.6 | ... | ... | ... | 57.2 | 66.0 | 48.8 | 29th | 74.0 | 7th   | 450 | 79.0 | 71.0 |
| Mean ...      | 29.992 | 68.5 | ... | ... | ... | 62.5 | 72.0 | 56.8 | ...  | 78.7 | ...   | 558 | 77.7 | 63.0 |

SCUTARI.

Lat. 41° N.

|               |        |      |     |     |     |      |      |      |      |      |      |     |      |      |
|---------------|--------|------|-----|-----|-----|------|------|------|------|------|------|-----|------|------|
| January ...   | 30.320 | 37.8 | ... | ... | ... | 33.1 | 44.8 | 23.0 | 1st  | 62.0 | 6th  | 191 | 84.6 | 66.0 |
| February ...  | 30.026 | 43.9 | ... | ... | ... | 37.6 | 51.6 | 29.2 | 22nd | 62.4 | 7th  | 234 | 80.2 | 62.0 |
| March ...     | 29.832 | 50.6 | ... | ... | ... | 42.6 | 59.9 | 32.6 | 9th  | 75.4 | 20th | 295 | 79.4 | 60.5 |
| April ...     | 29.960 | 54.2 | ... | ... | ... | 43.6 | 64.5 | 33.0 | 9th  | 76.4 | 18th | 335 | 78.4 | 54.4 |
| May ...       | 29.914 | 63.6 | ... | ... | ... | 51.4 | 75.8 | 40.3 | 22nd | 88.2 | 27th | 431 | 73.6 | 51.0 |
| June ...      | 29.826 | 71.6 | ... | ... | ... | 60.8 | 82.4 | 54.8 | 4th  | 92.2 | 28th | 564 | 72.4 | 45.6 |
| July ...      | 29.835 | 77.2 | ... | ... | ... | 64.0 | 87.2 | 57.8 | 2nd  | 94.2 | 29th | 600 | 64.4 | 51.2 |
| August ...    | 29.853 | 76.4 | ... | ... | ... | 63.7 | 87.4 | 54.7 | 21st | 94.5 | 3rd  | 621 | 68.6 | 52.0 |
| September ... | 29.911 | 73.4 | ... | ... | ... | 60.9 | 84.7 | 48.7 | 23rd | 98.0 | 15th | 514 | 62.8 | 48.8 |
| October ...   | 30.025 | 63.1 | ... | ... | ... | 54.4 | 71.5 | 45.3 | 3rd  | 80.5 | 1st  | 447 | 76.1 | 52.6 |
| November ...  | 29.942 | 48.2 | ... | ... | ... | 42.5 | 55.5 | 29.0 | 12th | 75.5 | 2nd  | 280 | 83.4 | 61.0 |
| December ...  | 29.921 | 50.3 | ... | ... | ... | 45.0 | 57.1 | 30.8 | 27th | 64.4 | 9th  | 308 | 84.9 | 66.4 |
| Mean ...      | 29.947 | 59.2 | ... | ... | ... | 49.9 | 68.5 | 39.9 | ...  | 80.3 | ...  | 402 | 75.7 | 56.0 |

No. X.

taken at Foreign Stations in the Year 1876.

Long. 5° 20' W. Height of Barometer Cistern above Sea, 53 feet.

| Mean Amount of Cloud. | Rainfall. |          |          | Weather.          |       |       |                 |      |            |           |        |      |      | Wind.                                    |      |     |      |       |      |        |  |  |  |
|-----------------------|-----------|----------|----------|-------------------|-------|-------|-----------------|------|------------|-----------|--------|------|------|------------------------------------------|------|-----|------|-------|------|--------|--|--|--|
|                       | Total.    | Maximum. | Day.     | Number of Days of |       |       |                 |      |            |           |        |      |      | Number of Observations under each Point. |      |     |      |       |      |        |  |  |  |
|                       |           |          |          | Rain.             | Snow. | Hail. | Thunder Storms. | Fog. | Clear Sky. | Overcast. | Gales. | N.   | N.E. | E.                                       | S.E. | S.  | S.W. | W.    | N.W. | Calms. |  |  |  |
|                       |           |          |          |                   |       |       |                 |      |            |           |        |      |      |                                          |      |     |      |       |      |        |  |  |  |
| 5.2                   | 3.46      | 0.64     | 23rd     | 12                | ...   | ...   | ...             | ...  | 11.0       | 12.0      | ..     | 1.5  | 6.5  | 7.0                                      | 2.0  | 1.0 | 3.5  | 4.0   | 5.5  | ...    |  |  |  |
| 5.3                   | 2.31      | 0.92     | 12th     | 7                 | ...   | ...   | 1               | ...  | 10.0       | 11.0      | 3      | 0.5  | 3.0  | 8.5                                      | 0.5  | ... | 4.5  | 6.0   | 6.0  | ...    |  |  |  |
| 4.1                   | 2.84      | 1.24     | 23rd     | 9                 | ...   | ...   | ...             | ...  | 16.0       | 8.0       | 4      | ...  | 1.0  | 7.0                                      | 2.0  | ... | ...  | 13.0  | 8.0  | ...    |  |  |  |
| 2.6                   | 0.68      | 0.39     | 20th     | 3                 | ...   | ...   | ...             | ...  | 21.0       | 5.0       | 1      | ...  | ...  | 8.0                                      | ...  | ... | 2.0  | 15.0  | 5.0  | ...    |  |  |  |
| 4.0                   | 0.61      | 0.30     | 18th     | 6                 | ...   | ...   | ...             | ...  | 15.0       | 8.0       | ...    | ...  | 0.5  | 9.5                                      | 1.5  | 1.0 | 1.5  | 12.0  | 5.0  | ...    |  |  |  |
| 2.3                   | 0.09      | 0.09     | 27th     | 1                 | ...   | ...   | 4.5             | ...  | 22.5       | 3.0       | ...    | ...  | ...  | 5.5                                      | 0.5  | 1.0 | 2.0  | 15.0  | 6.0  | ...    |  |  |  |
| 1.4                   | ...       | ...      | ...      | ...               | ...   | ...   | ...             | ...  | 26.5       | 0.5       | ...    | ...  | ...  | 22.5                                     | 1.0  | 3.5 | 0.5  | 3.5   | ...  | ...    |  |  |  |
| 2.3                   | ...       | ...      | ...      | ...               | ...   | ...   | ...             | ...  | 22.0       | 3.0       | ...    | ...  | 0.5  | 20.5                                     | ...  | ... | 0.5  | 8.5   | 1.0  | ...    |  |  |  |
| 2.1                   | 0.04      | 0.02     | 30th     | 2                 | ...   | ...   | ...             | ...  | 22.0       | 1.5       | ...    | ...  | ...  | 12.5                                     | 1.0  | ... | ...  | 16.0  | 0.5  | ...    |  |  |  |
| 5.5                   | 1.93      | 0.67     | 17th     | 9                 | ...   | ...   | 1               | ...  | 8.5        | 9.5       | 2      | 0.5  | 0.5  | 15.5                                     | 0.5  | 0.5 | 0.5  | 9.5   | 3.5  | ...    |  |  |  |
| 4.8                   | 9.97      | 2.60     | 8th      | 13                | ...   | ...   | ...             | ...  | 12.5       | 10.0      | 2      | 2.0  | 0.0  | 10.5                                     | 0.5  | 1.0 | 1.0  | 12.5  | 2.0  | 0.5    |  |  |  |
| 6.3                   | 9.79      | 1.90     | 20th     | 18                | ...   | 1     | 1               | ...  | 7.5        | 14.0      | 2      | 5.5  | 3.5  | 3.0                                      | ...  | 1.5 | 7.5  | 3.0   | 7.0  | ...    |  |  |  |
| 3.8                   | 31.62     | 2.60     | 8th Nov. | 80                | ...   | 1     | 3               | 4 5  | 191.5      | 55.5      | 14     | 10.0 | 15.5 | 130.0                                    | 9.5  | 9.5 | 23.5 | 118.0 | 49.5 | 0.5    |  |  |  |

Long. 14° 30' E. Height of Barometer Cistern above Sea, 70 feet.

|     |       |      |           |     |     |     |     |       |       |     |     |      |     |      |     |      |      |       |     |
|-----|-------|------|-----------|-----|-----|-----|-----|-------|-------|-----|-----|------|-----|------|-----|------|------|-------|-----|
| 7.0 | 2.33  | 0.59 | 17th      | 11  | ... | ... | ... | 2.0   | 17.0  | ... | ... | 5.5  | ... | 13.5 | ... | 4.5  | ...  | 7.5   | ... |
| 4.5 | 1.67  | 0.95 | 14th      | 5   | ... | ... | ... | 7.0   | 7.0   | ... | ... | 6.0  | ... | 1.5  | ... | 4.5  | ...  | 17.0  | ... |
| 5.0 | 0.73  | 0.37 | 20th      | 3   | ... | ... | ... | 7.0   | 9.0   | ... | ... | 3.5  | ... | 7.0  | ... | 2.5  | ...  | 18.0  | ... |
| 5.0 | 1.20  | 0.38 | 1st       | 7   | ... | ... | 1   | 6.0   | 10.0  | ... | ... | 5.0  | ... | 8.0  | ... | 5.5  | ...  | 11.5  | ... |
| 3.5 | 0.05  | 0.03 | 7th       | 2   | ... | ... | ... | 15.0  | 8.0   | ... | 0.5 | 5.5  | ... | 12.5 | ... | 2.5  | ...  | 10.0  | ... |
| 3.0 | 0.51  | 0.30 | 6th       | 4   | ... | ... | ... | 15.0  | 6.0   | ... | 0.5 | 10.0 | 0.5 | 5.0  | ... | 0.5  | 0.5  | 13.0  | ... |
| 2.0 | 0.00  | 0.00 | ...       | ... | ... | ... | ... | 22.0  | 2.0   | ... | 1.5 | 6.0  | ... | 0.5  | ... | 0.5  | 1.5  | 21.0  | ... |
| 3.0 | 0.00  | 0.00 | ...       | ... | ... | ... | ... | 15.0  | 2.0   | ... | 0.5 | 10.5 | 1.5 | 3.5  | 0.5 | 2.0  | 0.5  | 12.0  | ... |
| 4.8 | 0.02  | 0.02 | 15th      | 1   | ... | ... | ... | 5.0   | 7.0   | ... | 2.5 | 5.5  | 2.0 | 4.5  | 0.0 | 4.5  | 0.5  | 10.5  | ... |
| 6.0 | 3.52  | 1.44 | 16th      | 9   | ... | ... | ... | 4.0   | 13.5  | ... | 1.5 | 4.0  | 0.5 | 8.0  | 1.0 | 3.0  | 2.5  | 10.5  | ... |
| 6.9 | 0.96  | 0.28 | 3rd       | 6   | ... | ... | ... | ...   | 16.0  | ... | ... | 0.5  | ... | 8.5  | 1.0 | 5.0  | 1.0  | 18.5  | ... |
| 5.5 | 0.24  | 0.10 | 26th      | 3   | ... | ... | ... | 2.5   | 9.0   | ... | 2.0 | 0.5  | 0.5 | 3.0  | 1.5 | 8.5  | 6.0  | 9.0   | ... |
| 4.7 | 11.23 | 1.44 | 16th Oct. | 51  | ... | ... | 1   | 100.5 | 106.5 | ... | 9.0 | 62.5 | 5.0 | 70.5 | 4.0 | 44.0 | 12.5 | 158.5 | ... |

Long. 29° 3' E. Height of Barometer Cistern above Sea, 60 feet.

|     |       |      |          |     |     |     |     |      |       |       |     |      |       |      |      |      |      |      |     |      |
|-----|-------|------|----------|-----|-----|-----|-----|------|-------|-------|-----|------|-------|------|------|------|------|------|-----|------|
| 6.7 | 1.36  | 0.40 | 6th      | 18  | 5   | ... | ... | 6.0  | 17.0  | 1     | 6.0 | 7.5  | 7.5   | 1.5  | 2.5  | 3.0  | 0.5  | 1.0  | 1.0 |      |
| 6.9 | 1.45  | 0.56 | 9th      | 11  | ... | ... | 2   | 5.5  | 16.5  | 1     | 3.5 | 5.5  | 4.0   | 2.0  | 8.0  | 4.5  | 1.0  | ...  | 0.5 |      |
| 6.4 | 2.72  | 0.85 | 8th      | 12  | 1   | ... | 1   | 9.5  | 15.0  | ...   | 6.5 | 5.0  | 2.5   | 1.5  | 7.5  | 7.0  | ...  | ...  | 1.0 |      |
| 5.4 | 0.58  | 0.27 | 6th      | 7   | ... | ... | 1   | 11.5 | 12.0  | ...   | 1.5 | 17.0 | 0.5   | 0.5  | 1.0  | 4.5  | 1.5  | ...  | 2.5 |      |
| 4.4 | 1.83  | 0.78 | 30th     | 7   | ... | ... | 4   | 15.5 | 8.0   | ...   | 3.5 | 12.0 | 1.0   | ...  | 3.0  | 8.0  | 2.0  | ...  | 0.5 |      |
| 3.8 | 0.94  | 0.37 | 16th     | 8   | ... | ... | 7   | 16.0 | 3.0   | ...   | 1.5 | 5.0  | 0.5   | ...  | 12.0 | 8.5  | 1.5  | ...  | 0.5 |      |
| 3.5 | 3.70  | 3.10 | 5th      | 3   | ... | ... | 3   | 18.0 | 4.0   | ...   | 4.5 | 17.5 | 3.5   | ...  | 1.5  | 3.0  | 0.5  | 0.5  | ... |      |
| 3.8 | 3.73  | 1.48 | 11th     | 6   | ... | ... | 4   | 16.5 | 5.0   | ...   | 4.5 | 15.5 | 3.5   | ...  | 4.0  | 2.0  | 0.5  | ...  | 0.5 |      |
| 3.3 | 1.43  | 0.87 | 26th     | 5   | ... | ... | ... | 17.0 | 1.5   | ...   | 4.0 | 9.5  | 2.0   | ...  | 5.0  | 4.5  | 1.0  | 2.0  | 2.0 |      |
| 6.0 | 1.50  | 0.38 | 15th     | 10  | ... | ... | 1   | 11.0 | 14.5  | ...   | 2.0 | 16.5 | 5.5   | 0.5  | 1.0  | 2.0  | 0.0  | 0.5  | 2.5 |      |
| 7.8 | 5.86  | 1.06 | 11th     | 20  | 2   | 1   | ... | 3.5  | 20.0  | ...   | 8.5 | 6.0  | 3.0   | 3.5  | 2.0  | 1.5  | 2.5  | 2.0  | 0.5 |      |
| 7.3 | 5.08  | 1.37 | 27th     | 16  | 3   | ... | ... | 4.0  | 21.0  | 3     | 3.0 | 3.5  | 2.5   | 1.5  | 2.5  | 11.5 | 3.5  | ...  | 3.0 |      |
| 5.4 | 30.18 | 3.10 | 5th July | 122 | 11  | 1   | 22  | 1    | 124.0 | 137.5 | 5   | 49.0 | 120.5 | 36.0 | 11.0 | 50.0 | 60.0 | 14.5 | 6.0 | 14.5 |

January ½ day short. April 1 day short. May 1 day short. June ½ day short.  
August ½ day short. October ½ day short. November ½ day short.} Wind obs. x  
} 4½ days short.

## Appendix

## Annual Abstract of Meteorological Observations

FORT NAPIER, NATAL.

Lat. 29° 3' S.

| Month.        | Mean Pressure. | Air Temperature. |        |              |          |          |      |           |      |           |      | Tension of Vapour. | Relative Humidity. |      |      |
|---------------|----------------|------------------|--------|--------------|----------|----------|------|-----------|------|-----------|------|--------------------|--------------------|------|------|
|               |                | Hourly Means.    |        | Daily Means. |          | Means of |      | Abs. Min. |      | Abs. Max. |      |                    | Mean.              | Min. |      |
|               |                | 9 a.m.           | 9 p.m. | Simple.      | Reduced. | Min.     | Max. | Temp.     | Day. | Temp.     | Day. |                    |                    | Day. |      |
|               |                |                  |        |              |          |          |      |           |      |           |      |                    |                    |      |      |
| January ...   | 29.803         | 71.7             | ...    | ...          | ...      | 60.3     | 81.8 | 54.6      | 22nd | 97.7      | 2nd  | 528                | 67.4               | 49.0 | 28th |
| February ...  | 29.819         | 73.2             | ...    | ...          | ...      | 62.6     | 84.2 | 51.0      | 23rd | 94.3      | 2nd  | 537                | 65.6               | 38.8 | 3rd  |
| March ...     | 29.916         | 70.4             | ...    | ...          | ...      | 57.4     | 82.8 | 41.3      | 10th | 95.1      | 13th | 463                | 62.2               | 32.7 | 15th |
| April ...     | 30.046         | 65.7             | ...    | ...          | ...      | 53.8     | 77.1 | 45.8      | 27th | 90.4      | 9th  | 439                | 69.5               | 45.0 | 30th |
| May ...       | 30.040         | 61.7             | ...    | ...          | ...      | 48.7     | 75.2 | 39.5      | 28th | 89.7      | 5th  | 335                | 60.8               | 38.0 | 29th |
| June ...      | 30.120         | 57.1             | ...    | ...          | ...      | 45.3     | 71.1 | 34.6      | 30th | 83.6      | 6th  | 290                | 62.2               | 32.0 | 27th |
| July ...      | 30.141         | 56.9             | ...    | ...          | ...      | 43.3     | 73.5 | 35.8      | 9th  | 91.4      | 4th  | 271                | 58.6               | 37.2 | 24th |
| August ...    | 29.929         | 64.7             | ...    | ...          | ...      | 50.6     | 77.5 | 37.6      | 31st | 94.5      | 29th | 304                | 49.1               | 26.0 | 2nd  |
| September ... | 29.958         | 66.4             | ...    | ...          | ...      | 54.4     | 77.6 | 42.8      | 1st  | 97.9      | 22nd | 395                | 61.6               | 26.2 | 1st  |
| October ...   | 29.954         | 69.5             | ...    | ...          | ...      | 53.2     | 81.2 | 40.8      | 1st  | 99.1      | 11th | 391                | 53.9               | 23.0 | 5th  |
| November ...  | 29.866         | 68.8             | ...    | ...          | ...      | 55.4     | 79.7 | 43.7      | 12th | 98.3      | 30th | 445                | 62.4               | 43.5 | 30th |
| December ...  | 29.778         | 71.7             | ...    | ...          | ...      | 58.8     | 85.0 | 49.7      | 10th | 106.2     | 14th | 497                | 62.2               | 35.6 | 13th |
| Mean ...      | 29.947         | 66.5             | ...    | ...          | ...      | 53.6     | 78.9 | 43.6      | ...  | 94.8      | ...  | 408                | 61.3               | 33.6 | ...  |

## SIERRA LEONE.

Lat. 8° 29' N.

|               |        |      |     |     |     |      |      |      |      |      |      |     |      |      |      |
|---------------|--------|------|-----|-----|-----|------|------|------|------|------|------|-----|------|------|------|
| January ...   | 29.698 | 82.0 | ... | ... | ... | 72.1 | 90.9 | 67.0 | 2nd  | 95.0 | 11th | 853 | 78.0 | 67.0 | 3rd  |
| February ...  | 29.900 | 82.4 | ... | ... | ... | 72.0 | 91.1 | 70.0 | 9th  | 98.0 | 10th | 822 | 74.4 | 55.0 | 15th |
| March ...     | 29.874 | 82.9 | ... | ... | ... | 73.8 | 93.0 | 68.0 | 23rd | 97.0 | 24th | 885 | 76.0 | 64.0 | 22nd |
| April ...     | 29.904 | 83.9 | ... | ... | ... | 73.6 | 93.6 | 67.0 | 25th | 96.0 | 7th  | 920 | 79.4 | 69.0 | 16th |
| May ...       | 29.934 | 83.3 | ... | ... | ... | 71.4 | 92.2 | 66.0 | 21st | 97.0 | 5th  | 905 | 79.3 | 64.0 | 2nd  |
| June ...      | 29.987 | 83.4 | ... | ... | ... | 71.9 | 91.2 | 67.0 | 14th | 96.0 | 4th  | 963 | 78.9 | 67.0 | 16th |
| July ...      | 30.006 | 79.4 | ... | ... | ... | 69.0 | 86.3 | 64.0 | 10th | 97.0 | 3rd  | 822 | 82.4 | 67.0 | 25th |
| August ...    | 29.985 | 78.9 | ... | ... | ... | 68.7 | 83.6 | 66.0 | 23rd | 90.0 | 20th | 808 | 81.5 | 64.0 | 26th |
| September ... | 29.956 | 80.0 | ... | ... | ... | 68.5 | 84.9 | 65.0 | 13th | 92.0 | 30th | 834 | 81.5 | 68.0 | 16th |
| October ...   | 29.950 | 81.2 | ... | ... | ... | 68.5 | 88.0 | 64.0 | 31st | 94.0 | 4th  | 873 | 82.7 | 75.0 | 8th  |
| November ...  | 29.919 | 80.8 | ... | ... | ... | 67.6 | 89.0 | 63.0 | 3rd  | 92.0 | 13th | 852 | 81.0 | 63.0 | 28th |
| December ...  | 29.940 | 82.0 | ... | ... | ... | 69.3 | 89.5 | 67.0 | 5th  | 93.0 | 18th | 817 | 80.0 | 72.0 | 9th  |
| Mean ...      | 29.938 | 81.8 | ... | ... | ... | 70.5 | 89.4 | 66.2 | ...  | 94.7 | ...  | 863 | 79.6 | 66.3 | ...  |

## BARBADOES.

Lat. 13° 4' N.

|               |        |      |     |     |     |      |      |      |      |      |      |     |      |      |      |
|---------------|--------|------|-----|-----|-----|------|------|------|------|------|------|-----|------|------|------|
| January ...   | 30.029 | 79.1 | ... | ... | ... | 72.2 | 82.8 | 64.0 | 16th | 86.0 | 7th  | 697 | 69.8 | 51.3 | 6th  |
| February ...  | 30.093 | 79.5 | ... | ... | ... | 71.2 | 84.1 | 65.0 | 13th | 86.0 | 25th | 636 | 63.4 | 46.1 | 14th |
| March ...     | 30.033 | 80.2 | ... | ... | ... | 72.1 | 84.9 | 68.0 | 7th  | 87.0 | 20th | 641 | 62.0 | 46.0 | 25th |
| April ...     | 30.048 | 82.0 | ... | ... | ... | 73.2 | 86.0 | 70.0 | 23rd | 88.0 | 3rd  | 693 | 63.2 | 53.4 | 18th |
| May ...       | 30.033 | 82.9 | ... | ... | ... | 75.0 | 85.6 | 72.0 | 5th  | 89.0 | 29th | 739 | 65.6 | 60.8 | 9th  |
| June ...      | 30.066 | 82.6 | ... | ... | ... | 76.6 | 86.1 | 71.0 | 11th | 89.0 | 19th | 752 | 67.4 | 57.0 | 20th |
| July ...      | 30.060 | 82.1 | ... | ... | ... | 75.6 | 85.7 | 70.0 | 4th  | 87.6 | 27th | 780 | 71.2 | 60.0 | 7th  |
| August ...    | 30.038 | 83.3 | ... | ... | ... | 74.4 | 87.8 | 72.0 | 1st  | 90.0 | 30th | 809 | 71.2 | 57.0 | 30th |
| September ... | 29.991 | 83.3 | ... | ... | ... | 74.0 | 88.1 | 70.0 | 30th | 93.0 | 11th | 786 | 69.2 | 50.4 | 8th  |
| October ...   | 29.990 | 82.5 | ... | ... | ... | 74.0 | 86.5 | 72.0 | 10th | 87.5 | 23rd | 820 | 74.0 | 63.2 | 28th |
| November ...  | 29.983 | 83.2 | ... | ... | ... | 74.6 | 87.0 | 73.0 | 2nd  | 89.5 | 7th  | 816 | 72.0 | 61.0 | 10th |
| December ...  | 30.005 | 82.5 | ... | ... | ... | 73.3 | 86.6 | 71.5 | 1st  | 88.0 | 3rd  | 740 | 66.4 | 54.0 | 28th |
| Mean ...      | 30.031 | 81.9 | ... | ... | ... | 73.8 | 85.9 | 69.9 | ...  | 88.4 | ...  | 742 | 67.9 | 55.0 | ...  |

No. X.—*continued.*

taken at Foreign Stations in the Year 1876.

Long. 30° 2' E. Height of Barometer Cistern above Sea, 2,200 feet.

| Mean Amount of Cloud. | Rainfall. |          |         | Weather.          |       |       |                 |      |           |           |        | Wind.                                    |      |       |      |      |      |     |      |        |  |
|-----------------------|-----------|----------|---------|-------------------|-------|-------|-----------------|------|-----------|-----------|--------|------------------------------------------|------|-------|------|------|------|-----|------|--------|--|
|                       | Total.    | Maximum. | Day.    | Number of Days of |       |       |                 |      |           |           |        | Number of Observations under each Point. |      |       |      |      |      |     |      |        |  |
|                       |           |          |         | Rain.             | Snow. | Hail. | Thunder Storms. | Fog. | Clear Sky | Overcast. | Gales. | N.                                       | N.E. | E.    | S.E. | S.   | S.W. | W.  | N.W. | Calms. |  |
|                       |           |          |         |                   |       |       |                 |      |           |           |        |                                          |      |       |      |      |      |     |      |        |  |
| 6.8                   | 4.77      | 2.05     | 3rd     | 10                | ...   | ...   | 7               | ...  | 8.0       | 20.0      | ...    | 1.0                                      | 4.5  | 18.5  | 4.5  | 1.5  | ...  | ... | ...  | 1.0    |  |
| 7.2                   | 7.23      | 1.31     | 3rd     | 20                | ...   | ...   | 11              | ...  | 6.5       | 19.0      | ...    | 1.0                                      | 3.5  | 14.5  | 7.0  | 0.5  | ...  | ... | ...  | 1.0    |  |
| 6.0                   | 1.71      | 0.90     | 8th     | 5                 | ...   | ...   | 9               | ...  | 10.5      | 17.0      | ...    | 1.0                                      | 2.5  | 20.0  | 2.5  | 1.0  | ...  | ... | ...  | 1.5    |  |
| 5.3                   | 3.17      | 1.29     | 20th    | 8                 | ...   | ...   | 1               | ...  | 13.0      | 15.0      | ...    | 1.0                                      | 1.5  | 21.0  | 2.5  | 1.5  | ...  | 1.5 | 0.5  | 0.5    |  |
| 3.8                   | 0.20      | 0.09     | 6th     | 3                 | ...   | ...   | 1               | ...  | 18.0      | 10.5      | ...    | 0.5                                      | 3.5  | 17.5  | 6.5  | 1.5  | ...  | ... | ...  | 1.5    |  |
| 2.0                   | 0.01      | 0.01     | 26th    | 1                 | ...   | ...   | 1               | ...  | 21.0      | 8.0       | ...    | 0.5                                      | 4.0  | 16.0  | 7.0  | 0.5  | 0.5  | ... | ...  | 1.5    |  |
| 1.9                   | 0.20      | 0.20     | 25th    | 1                 | ...   | ...   | ...             | ...  | 26.0      | 5.0       | ...    | ...                                      | 2.0  | 18.0  | 5.5  | 1.0  | 0.5  | ... | ...  | 0.5    |  |
| 3.9                   | 0.60      | 0.50     | 26th    | 2                 | ...   | ...   | ...             | ...  | 18.0      | 12.0      | 1      | 1.5                                      | 2.5  | 11.5  | 4.5  | 1.5  | 0.5  | 2.0 | 6.5  | 0.5    |  |
| 6.6                   | 3.20      | 1.24     | 27th    | 11                | ...   | ...   | 10              | ...  | 11.0      | 18.5      | 1      | 0.5                                      | 6.0  | 14.5  | 4.0  | 0.5  | ...  | 1.0 | 3.5  | ...    |  |
| 5.2                   | 3.05      | 2.90     | 26th    | 4                 | ...   | ...   | 2               | ...  | 13.5      | 14.5      | ...    | 0.5                                      | 5.0  | 15.5  | 4.5  | 2.0  | ...  | ... | 3.5  | ...    |  |
| 6.7                   | 2.71      | 1.80     | 22nd    | 13                | ...   | ...   | 10              | ...  | 8.0       | 21.0      | ...    | 0.5                                      | 3.5  | 18.5  | 4.5  | 2.5  | ...  | ... | 0.5  | ...    |  |
| 6.5                   | 2.08      | 0.70     | 17th    | 15                | ...   | 1     | 10              | ...  | 9.5       | 20.0      | 1      | 1.5                                      | 9.0  | 14.0  | 3.5  | ...  | ...  | ... | 2.5  | 0.5    |  |
| 5.2                   | 28.93     | 2.90     | 26 Oct. | 93                | ...   | 1     | 62              | ...  | 163.0     | 180.5     | 3      | 9.5                                      | 47.5 | 199.5 | 56.5 | 14.0 | 1.5  | 4.5 | 23.0 | 10.0   |  |

Long. 13° 9' W. Height of Barometer Cistern above Sea, 224 feet.

|     |        |      |         |     |     |     |     |     |      |      |     |       |      |      |     |     |     |       |     |      |
|-----|--------|------|---------|-----|-----|-----|-----|-----|------|------|-----|-------|------|------|-----|-----|-----|-------|-----|------|
| 5.2 | ...    | ...  | ...     | ... | ... | ... | ... | ... | 6.5  | 5.0  | 2   | 22.0  | 1.5  | 3.0  | ... | ... | ... | 4.0   | ... | 0.5  |
| 6.7 | 0.07   | 0.07 | 5th     | 1   | ... | ... | ... | ... | 3.0  | 15.0 | 3   | 20.0  | 1.5  | 2.5  | ... | ... | ... | 5.0   | ... | ...  |
| 6.1 | 0.35   | 0.22 | 23rd    | 2   | ... | ... | 1   | ... | 3.0  | 8.0  | 2   | 19.0  | 5.0  | 0.5  | ... | ... | ... | 6.5   | ... | ...  |
| 6.5 | 5.30   | 2.23 | 17th    | 5   | ... | ... | 8   | ... | 1.0  | 9.0  | ... | 17.0  | 2.5  | 4.0  | ... | ... | ... | 6.5   | ... | ...  |
| 7.1 | 16.23  | 3.62 | 21st    | 18  | ... | ... | 8   | ... | ...  | 12.0 | 3   | 9.0   | 2.0  | 7.5  | 0.5 | ... | ... | 10.5  | ... | 1.5  |
| 6.0 | 19.40  | 3.22 | 1st     | 22  | ... | ... | 5   | ... | ...  | 12.0 | 1   | 5.5   | 0.5  | 10.5 | 0.5 | 0.5 | 1.0 | 10.5  | 0.5 | 0.5  |
| 7.0 | 33.17  | 4.35 | 12th    | 26  | ... | ... | 1   | ... | ...  | 10.0 | 2   | 3.5   | 0.5  | 4.5  | ... | ... | ... | 20.5  | ... | 2.0  |
| 7.0 | 34.03  | 4.31 | 13th    | 28  | ... | ... | 3   | ... | ...  | 8.0  | ... | 2.0   | ...  | 1.0  | ... | ... | ... | 28.0  | ... | ...  |
| 6.2 | 46.67  | 3.27 | 1st     | 28  | ... | ... | 5   | ... | ...  | 6.0  | ... | 2.5   | ...  | 4.0  | ... | ... | ... | 22.0  | ... | 1.5  |
| 6.0 | 12.68  | 2.13 | 7th     | 23  | ... | ... | 9   | ... | 0.5  | 1.0  | ... | 2.5   | 2.0  | 6.0  | ... | 0.5 | ... | 12.5  | ... | 7.5  |
| 5.0 | 4.78   | 1.03 | 27th    | 13  | ... | ... | 11  | ... | 3.0  | 2.0  | ... | 6.0   | 1.0  | 4.5  | 0.5 | ... | ... | 12.0  | 0.5 | 5.5  |
| 4.0 | 0.24   | 0.24 | 5th     | 1   | ... | ... | 2   | ... | 12.5 | ...  | ... | 11.0  | 2.5  | 2.5  | ... | ... | ... | 6.0   | 1.0 | 8.0  |
| 6.1 | 172.92 | 4.35 | 12 Jly. | 167 | ... | ... | 53  | ... | 29.5 | 88.0 | 13  | 120.0 | 19.0 | 50.5 | 1.5 | 0.5 | 1.5 | 144.0 | 2.0 | 27.0 |

Long. 59° 40' W. Height of Barometer Cistern above Sea, 30 feet.

|     |       |      |          |     |     |     |     |     |      |      |     |     |       |      |      |     |     |     |     |     |
|-----|-------|------|----------|-----|-----|-----|-----|-----|------|------|-----|-----|-------|------|------|-----|-----|-----|-----|-----|
| 5.8 | 3.19  | 1.42 | 7th      | 15  | ... | ... | ... | ... | 7.0  | 7.0  | ... | ... | 16.0  | 5.5  | 9.5  | ... | ... | ... | ... | ... |
| 4.6 | 0.31  | 0.18 | 28th     | 11  | ... | ... | ... | ... | 8.0  | 3.0  | ... | ... | 25.5  | 3.5  | ...  | ... | ... | ... | ... | ... |
| 5.6 | 1.70  | 0.67 | 2nd      | 10  | ... | ... | ... | ... | 7.0  | 6.0  | ... | ... | 26.0  | 4.0  | 1.0  | ... | ... | ... | ... | ... |
| 6.7 | 0.90  | 0.23 | 18th     | 8   | ... | ... | ... | ... | 1.0  | 4.0  | ... | ... | 27.5  | 0.5  | 2.0  | ... | ... | ... | ... | ... |
| 7.9 | 2.28  | 0.45 | 10th     | 14  | ... | ... | ... | ... | ...  | 16.0 | 1   | 0.5 | 21.5  | 1.0  | 8.0  | ... | ... | ... | ... | ... |
| 7.2 | 4.14  | 1.45 | 11th     | 13  | ... | ... | 1   | ... | ...  | 10.0 | 1   | ... | 25.5  | 1.0  | 8.5  | ... | ... | ... | ... | ... |
| 6.8 | 7.31  | 2.50 | 5th      | 19  | ... | ... | 2   | ... | 0.5  | 9.5  | 1   | ... | 22.5  | 7.0  | 1.5  | ... | ... | ... | ... | ... |
| 6.4 | 2.70  | 1.30 | 3rd      | 7   | ... | ... | 1   | ... | 1.0  | 6.0  | ... | ... | 21.5  | 3.0  | 6.0  | ... | 0.5 | ... | ... | ... |
| 7.2 | 11.91 | 3.50 | 24th     | 17  | ... | ... | 1   | ... | ...  | 13.0 | 1   | ... | 26.0  | 1.5  | 2.5  | ... | ... | ... | ... | ... |
| 5.6 | 10.20 | 3.25 | 10th     | 14  | ... | ... | ... | ... | ...  | 8.0  | ... | ... | 24.5  | 2.0  | 4.5  | ... | ... | ... | ... | ... |
| 5.7 | 2.45  | 0.60 | 20th     | 8   | ... | ... | ... | ... | 0.5  | 4.0  | ... | ... | 25.0  | 1.0  | 4.0  | ... | ... | ... | ... | ... |
| 3.2 | 3.04  | 0.65 | 7th      | 13  | ... | ... | 2   | ... | 0.5  | 4.0  | ... | ... | 27.0  | 1.0  | 3.0  | ... | ... | ... | ... | ... |
| 5.8 | 60.81 | 2.50 | 24 Sept. | 149 | ... | ... | 7   | ... | 25.5 | 90.5 | 4   | 0.5 | 238.5 | 31.0 | 45.5 | ... | 0.5 | ... | ... | ... |

## Appendix

## Annual Abstract of Meteorological Observations

NEWCASTLE, JAMAICA.

Lat. 18° 62' N.

| Month.        | Mean Pressure. | Air Temperature. |        |              |          |          |      |           |      |           |      | Tension of Vapour. | Relative Humidity. |          |      |
|---------------|----------------|------------------|--------|--------------|----------|----------|------|-----------|------|-----------|------|--------------------|--------------------|----------|------|
|               |                | Hourly Means.    |        | Daily Means. |          | Means of |      | Abs. Min. |      | Abs. Max. |      |                    | Mean.              | Minimum. |      |
|               |                | 9 a.m.           | 9 p.m. | Simple.      | Reduced. | Min.     | Max. | Temp.     | Day. | Temp.     | Day. |                    |                    | Day.     |      |
|               |                |                  |        |              |          |          |      |           |      |           |      |                    |                    |          |      |
| January ...   | 30.054         | 63.0             | ...    | ...          | ...      | ...      | 73.0 | ...       | ...  | 80.0      | 20th | .447               | 78.5               | 45.0     | 11th |
| February ...  | 30.117         | 63.9             | ...    | ...          | ...      | ...      | 76.0 | ...       | ...  | 81.0      | 22nd | .424               | 71.0               | 52.9     | 15th |
| March ...     | 30.063         | 65.3             | ...    | ...          | ...      | ...      | 75.4 | ...       | ...  | 79.0      | 2nd  | .445               | 72.8               | 60.0     | 22nd |
| April ...     | 30.131         | 68.8             | ...    | ...          | ...      | 55.4     | 75.6 | 52.0      | 4th  | 81.4      | 28th | .498               | 70.5               | 46.5     | 14th |
| May ...       | 30.153         | 70.4             | ...    | ...          | ...      | 56.4     | 77.1 | 52.0      | 18th | 82.0      | 10th | .582               | 80.0               | 58.0     | 10th |
| June ...      | 30.188         | 73.2             | ...    | ...          | ...      | 60.1     | 81.6 | 54.0      | 3rd  | 86.0      | 15th | .568               | 70.0               | 56.1     | 11th |
| July ...      | 30.160         | 72.1             | ...    | ...          | ...      | 61.4     | 80.2 | 58.0      | 18th | 86.0      | 16th | .560               | 71.0               | 55.0     | 7th  |
| August ...    | 30.127         | 72.9             | ...    | ...          | ...      | 60.2     | 81.4 | 58.0      | 7th  | 86.0      | 6th  | .568               | 70.0               | 65.0     | 22nd |
| September ... | 30.002         | 72.5             | ...    | ...          | ...      | 60.7     | 81.5 | 57.0      | 26th | 87.0      | 30th | .603               | 76.0               | 65.0     | 9th  |
| October ...   | 29.985         | 70.2             | ...    | ...          | ...      | 59.0     | 77.5 | 52.0      | 15th | 83.0      | 3rd  | .584               | 78.5               | 53.0     | 6th  |
| November ...  | 29.972         | 70.6             | ...    | ...          | ...      | 59.3     | 79.0 | 57.0      | 26th | 85.0      | 29th | .570               | 75.0               | 61.0     | 29th |
| December ...  | 30.064         | 69.8             | ...    | ...          | ...      | 57.8     | 78.6 | 51.0      | 3rd  | 84.0      | 25th | .555               | 76.0               | 61.0     | 14th |
| Mean ...      | 30.085         | 69.4             | ...    | ...          | ...      | 58.9     | 78.1 | 54.6      | ...  | 83.5      | ...  | .534               | 74.1               | 55.7     | ..   |

UP-PARK CAMP, JAMAICA.

Lat. 17° 59' N.

|                |        |      |     |     |     |      |       |      |      |       |       |      |      |      |      |
|----------------|--------|------|-----|-----|-----|------|-------|------|------|-------|-------|------|------|------|------|
| January ...    | 30.023 | 83.8 | ... | ... | ... | 64.1 | 98.0  | 60.0 | 4th  | 101.0 | 1st   | .586 | 50.7 | 43.0 | 9th  |
| February ...   | 30.091 | 85.8 | ... | ... | ... | 64.2 | 95.7  | 60.0 | 19th | 98.0  | 16th  | .588 | 50.7 | 43.3 | 1st  |
| March ...      | 29.997 | 82.8 | ... | ... | ... | 61.0 | 96.6  | 63.0 | 1st  | 98.0  | 10th  | .691 | 62.0 | 53.7 | 19th |
| April ...      | 30.027 | 84.9 | ... | ... | ... | 64.1 | 98.7  | 63.0 | 3rd  | 99.0  | 7th   | .683 | 56.4 | 52.0 | 12th |
| May ...        | 30.005 | 85.0 | ... | ... | ... | 64.2 | 98.6  | 63.0 | 31st | 99.0  | 28th  | .718 | 59.5 | 55.0 | 30th |
| June ...       | 30.020 | 87.4 | ... | ... | ... | 64.3 | 98.6  | 63.0 | 9th  | 99.0  | 21dys | .714 | 54.7 | 44.8 | 22nd |
| *July ...      | 30.060 | 87.4 | ... | ... | ... | ...  | 100.4 | ...  | ...  | 102.0 | 17th  | .664 | 50.8 | 43.0 | 7th  |
| *August ...    | 30.128 | ...  | ... | ... | ... | ...  | ...   | ...  | ...  | ...   | ...   | ...  | ...  | ...  | ...  |
| *September ... | 30.076 | ...  | ... | ... | ... | ...  | ...   | ...  | ...  | ...   | ...   | ...  | ...  | ...  | ...  |
| October ...    | 29.849 | 82.7 | ... | ... | ... | 55.5 | ...   | 54.0 | 6th  | ...   | ...   | .785 | 70.4 | 68.0 | 5th  |
| November ...   | 29.743 | 82.0 | ... | ... | ... | 55.0 | ...   | 53.0 | 2nd  | ...   | ...   | .767 | 73.6 | 67.0 | 9th  |
| December ...   | 29.758 | 85.0 | ... | ... | ... | 54.6 | ...   | 50.0 | 2nd  | ...   | ...   | .799 | 65.6 | 55.0 | 28th |
| Mean ...       | 29.981 | 84.7 | ... | ... | ... | 61.1 | ...   | 58.8 | ...  | ...   | ...   | .699 | 59.4 | 50.5 | ...  |

NASSAU, BAHAMAS.

Lat. 25° 5' N.

|               |        |      |     |     |     |      |      |      |      |      |      |      |      |      |      |
|---------------|--------|------|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|
| January ...   | 30.265 | 73.4 | ... | ... | ... | 66.8 | 76.8 | 62.2 | 15th | 80.7 | 31st | .523 | 64.0 | 52.1 | 15th |
| February ...  | 30.196 | 74.7 | ... | ... | ... | 66.2 | 78.9 | 61.3 | 5th  | 83.6 | 3rd  | .604 | 70.0 | 52.4 | 23th |
| March ...     | 30.153 | 73.9 | ... | ... | ... | 66.3 | 78.2 | 62.4 | 30th | 83.2 | 17th | .672 | 68.4 | 55.0 | 24th |
| April ...     | 30.127 | 77.9 | ... | ... | ... | 67.5 | 83.5 | 61.4 | 8th  | 89.1 | 29th | .636 | 65.8 | 49.0 | 6th  |
| May ...       | 30.088 | 80.9 | ... | ... | ... | 71.5 | 86.5 | 67.1 | 13th | 93.6 | 2nd  | .715 | 78.0 | 55.8 | 8th  |
| June ...      | 30.089 | 82.0 | ... | ... | ... | 73.9 | 88.0 | 70.1 | 3rd  | 91.2 | 5th  | .780 | 71.6 | 51.3 | 12th |
| July ...      | 30.122 | 85.6 | ... | ... | ... | 74.6 | 90.7 | 72.4 | 24th | 94.6 | 17th | .784 | 63.4 | 57.0 | 9th  |
| August ...    | 30.087 | 84.8 | ... | ... | ... | 74.7 | 90.9 | 71.6 | 23rd | 94.5 | 5th  | .798 | 66.6 | 55.5 | 24th |
| September ... | 30.012 | 82.8 | ... | ... | ... | 73.0 | 89.1 | 68.0 | 6th  | 94.5 | 15th | .823 | 72.4 | 60.8 | 21st |
| October ...   | 30.016 | 81.3 | ... | ... | ... | 73.8 | 86.2 | 67.5 | 22nd | 95.7 | 15th | .771 | 72.4 | 55.0 | 27th |
| November ...  | 30.039 | 74.6 | ... | ... | ... | 68.4 | 79.3 | 60.0 | 30th | 87.0 | 2nd  | .627 | 73.1 | 62.0 | 22nd |
| December ...  | 30.104 | 70.6 | ... | ... | ... | 65.8 | 76.3 | 53.5 | 1st  | 85.0 | 7th  | .582 | 76.5 | 53.0 | 3rd  |
| Mean ...      | 30.108 | 78.5 | ... | ... | ... | 70.2 | 83.7 | 64.8 | ...  | 89.4 | ...  | .685 | 69.3 | 54.9 | ...  |

\* July Observations of Temperature and Wind, 1st to 19th only. August and September, Instruments in store (Observatory blown down, 19th July).



No. X.—continued.

taken at Foreign Stations in the Year 1876.

Long. 76° 42' W. Height of Barometer Cistern above Sea, 3,800 feet.

| Mean Amount of Cloud. | Rainfall |          |           | Weather.          |       |       |                 |      |            |           |         | Wind.                                    |      |      |      |      |      |     |      |        |
|-----------------------|----------|----------|-----------|-------------------|-------|-------|-----------------|------|------------|-----------|---------|------------------------------------------|------|------|------|------|------|-----|------|--------|
|                       | Total.   | Maximum. | Day.      | Number of Days of |       |       |                 |      |            |           |         | Number of Observations under each Point. |      |      |      |      |      |     |      |        |
|                       |          |          |           | Rain.             | Snow. | Hail. | Thunder Storms. | Fog. | Clear Sky. | Overcast. | *Gales. | N.                                       | N.E. | E.   | S.E. | S.   | S.W. | W.  | N.W. | Calms. |
|                       |          |          |           |                   |       |       |                 |      |            |           |         |                                          |      |      |      |      |      |     |      |        |
| 4.0                   | 16.40    | 2.00     | 8th       | 15                | ...   | ...   | ...             | ...  | 11         | 10        | ...     | ...                                      | 6.5  | ...  | ...  | ...  | ...  | ... | 12.0 | 12.5   |
| 1.7                   | 0.70     | 0.25     | 14th      | 4                 | ...   | ...   | ...             | ...  | 23         | ...       | ...     | ...                                      | 1.0  | ...  | ...  | ...  | ...  | ... | 6.0  | 22.0   |
| 2.3                   | 2.15     | 0.50     | 7th       | 6                 | ...   | ...   | ...             | ...  | 22         | ...       | ...     | ...                                      | 2.5  | ...  | ...  | ...  | ...  | ... | 6.5  | 22.0   |
| 5.3                   | 12.15    | 2.50     | 24th      | 18                | ...   | ...   | ...             | ...  | 9          | 10        | ...     | ...                                      | 1.5  | ...  | 5.5  | 7.5  | 2.5  | ... | 0.5  | 12.5   |
| 6.5                   | 8.11     | 1.83     | 15th      | 25                | ...   | ...   | 2               | ...  | 1          | 10        | 3       | ...                                      | 5.0  | 1.0  | 6.5  | 5.0  | 3.5  | 0.5 | ...  | 9.5    |
| 4.9                   | 9.02     | 2.32     | 3rd       | 17                | ...   | ...   | ...             | ...  | 10         | 6         | 2       | ...                                      | 1.0  | 0.5  | 18.0 | 1.5  | ...  | 0.5 | ...  | 8.5    |
| 4.8                   | 10.65    | 6.00     | 20th      | 9                 | ...   | ...   | 3               | ...  | 9          | 6         | 2       | ...                                      | ...  | 3.5  | 11.5 | 6.0  | 0.5  | ... | ...  | 9.5    |
| 5.3                   | 9.28     | 2.10     | 25th      | 16                | ...   | ...   | 5               | ...  | 9          | 8         | ...     | ...                                      | ...  | 1.5  | 6.0  | 3.5  | 0.5  | 1.0 | ...  | 18.5   |
| 5.1                   | 11.65    | 1.75     | 16th      | 18                | ...   | ...   | 4               | ...  | 10         | 10        | 3       | ...                                      | ...  | 1.0  | 11.0 | 2.5  | ...  | 2.0 | ...  | 13.5   |
| 5.4                   | 27.17    | 5.80     | 15th      | 19                | ...   | ...   | 3               | ...  | 11         | 10        | 4       | ...                                      | ...  | 12.0 | 7.0  | 0.5  | 1.5  | 1.0 | ...  | 9.0    |
| 5.2                   | 12.63    | 2.35     | 10th      | 21                | ...   | ...   | 1               | ...  | 10         | 9         | ...     | ...                                      | ...  | 6.5  | 5.5  | 1.5  | ...  | 2.0 | ...  | 14.5   |
| 3.9                   | 4.21     | 1.85     | 29th      | 10                | ...   | ...   | 1               | ...  | 16         | 5         | 1       | 2.0                                      | 5.0  | 12.0 | ...  | 0.5  | 0.5  | ... | ...  | 11.0   |
| 4.5                   | 124.12   | 5.80     | 15th Oct. | 178               | ...   | ...   | 21              | ...  | 141        | 84        | 15      | 2.0                                      | 22.5 | 33.0 | 71.0 | 28.5 | 9.0  | 7.0 | 25.0 | 163.0  |

Long. 76° 56' W. Height of Barometer Cistern above Sea, 235 feet.

|     |       |      |           |     |     |     |     |     |       |     |     |     |      |      |       |      |     |     |     |     |
|-----|-------|------|-----------|-----|-----|-----|-----|-----|-------|-----|-----|-----|------|------|-------|------|-----|-----|-----|-----|
| 5.1 | 12.93 | 3.60 | 6th       | 7   | ... | ... | ... | ... | 2.0   | 7   | ... | ... | 3.5  | 6.0  | 21.5  | ...  | ... | ... | ... | ... |
| 3.9 | 0.54  | 0.50 | 27th      | 4   | ... | ... | ... | ... | 7.5   | 0.5 | 1   | 0.5 | 4.5  | 2.5  | 21.5  | ...  | ... | ... | ... | ... |
| 2.6 | 0.03  | 0.03 | 15th      | 1   | ... | ... | ... | ... | 28.0  | ... | ... | ... | 8.5  | ...  | 22.0  | ...  | 0.5 | ... | ... | ... |
| 2.9 | 1.61  | 0.56 | 30th      | 4   | ... | ... | ... | ... | 23.0  | ... | ... | 1.0 | 6.5  | ...  | 22.5  | ...  | ... | ... | ... | ... |
| 3.1 | 3.76  | 1.25 | 16th      | 13  | ... | ... | ... | ... | 22.0  | ... | ... | ... | 3.5  | ...  | 27.0  | ...  | 0.5 | ... | ... | ... |
| 3.1 | 0.94  | 0.65 | 3rd       | 3   | ... | ... | ... | ... | 22.0  | ... | ... | ... | 0.5  | 1.0  | 4.0   | 23.0 | 1.5 | ... | ... | ... |
| 3.3 | 6.59  | 2.40 | 19th      | 11  | ... | ... | 7   | ... | 19.0  | 1   | 1   | 0.5 | 3.5  | 8.0  | 6.0   | 0.5  | ... | 0.5 | ... | ... |
| 3.6 | 4.09  | 1.12 | 17th      | 14  | ... | ... | ... | ... | 17.5  | ... | ... | ... | ...  | ...  | ...   | ...  | ... | ... | ... | ... |
| 4.0 | 6.28  | 2.14 | 15th      | 13  | ... | ... | 4   | ... | 9.0   | ... | ... | ... | ...  | ...  | ...   | ...  | ... | ... | ... | ... |
| 3.7 | 14.74 | 5.91 | 14th      | 16  | ... | ... | ... | ... | 16.5  | ... | 1   | ... | 11.0 | 6.5  | 13.0  | 0.5  | ... | ... | ... | ... |
| 3.8 | 6.03  | 1.15 | 25th      | 18  | ... | ... | ... | ... | 15.0  | ... | ... | 1.5 | 10.0 | 12.0 | 6.5   | ...  | ... | ... | ... | ... |
| 3.2 | 3.14  | 1.40 | 29th      | 7   | ... | ... | 3   | ... | 25.0  | ... | ... | 3.5 | 12.0 | 9.0  | 6.5   | ...  | ... | ... | ... | ... |
| 3.6 | 60.68 | 5.91 | 14th Oct. | 111 | ... | ... | 14  | ... | 206.5 | 8.5 | 3   | 7.5 | 64.0 | 48.0 | 169.5 | 2.5  | 1.0 | 0.5 | ... | ... |

Long. 77° 21' W. Height of Barometer Cistern above Sea, 44 feet.

|     |       |      |          |     |     |     |     |     |     |      |     |      |       |      |      |     |      |      |      |     |
|-----|-------|------|----------|-----|-----|-----|-----|-----|-----|------|-----|------|-------|------|------|-----|------|------|------|-----|
| 6.3 | 0.64  | 0.26 | 28th     | 4   | ... | ... | ... | ... | 2   | 9    | ... | 3.0  | 19.0  | 3.0  | 5    | ... | ...  | ...  | 1.0  | ... |
| 7.6 | 2.42  | 1.25 | 4th      | 6   | ... | ... | ... | ... | ... | 17   | ... | 2.0  | 10.0  | 6.0  | 6    | 1   | 2    | ...  | 2.0  | ... |
| 5.5 | 2.29  | 1.89 | 25th     | 2   | ... | ... | ... | ... | 1   | 13   | ... | 4.0  | 11.0  | 3.0  | 5.5  | ... | 2.5  | 3    | 2.0  | ... |
| 6.3 | 2.14  | 1.56 | 16th     | 2   | ... | ... | ... | ... | 1   | 9    | ... | 6.5  | 14.5  | 0.5  | 4.5  | 1.0 | 0.5  | 1    | 1.6  | ... |
| 7.0 | 14.17 | 5.20 | 28th     | 8   | ... | ... | ... | ... | ... | 16   | ... | 2.5  | 19.0  | 2.0  | 5.0  | 0.5 | 0.5  | 0.5  | 1.0  | ... |
| 8.2 | 11.64 | 4.94 | 10th     | 12  | ... | ... | 3   | ... | ... | 22   | ... | 0.5  | 12.5  | 5.5  | 9.5  | 1.5 | ...  | ...  | 0.5  | ... |
| 7.0 | 3.07  | 0.61 | 1st      | 12  | ... | ... | 5   | ... | ... | 17   | ... | 0.5  | 13.5  | 2.0  | 14.0 | 1.0 | ...  | ...  | ...  | ... |
| 7.5 | 5.68  | 1.85 | 22nd     | 11  | ... | ... | 6   | ... | ... | 22.5 | ... | 0.5  | 11.5  | 3.5  | 9.5  | ... | 1.5  | 1.5  | 3.0  | ... |
| 6.5 | 30.48 | 4.24 | 27th     | 21  | ... | ... | 5   | ... | 3   | 11.0 | ... | 1.0  | 12.0  | 2.5  | 9.5  | 1.0 | 1.0  | ...  | 2.0  | 1.0 |
| 4.5 | 4.62  | 1.52 | 14th     | 17  | ... | ... | ... | ... | 4   | 7.0  | 1   | 1.0  | 9.0   | 4.0  | 10.0 | ... | ...  | 3.0  | 4.0  | ... |
| 5.5 | 5.70  | 3.33 | 8th      | 7   | ... | ... | ... | ... | 8   | 8.0  | 1   | 1.5  | 14.0  | 1.0  | 1.0  | 0.5 | 3.0  | 0.5  | 6.0  | 2.5 |
| 4.1 | 2.60  | 1.73 | 10th     | 8   | ... | ... | 4   | ... | 15  | 4.5  | 1   | 3.0  | 11.0  | 0.0  | 7.0  | 1.0 | 1.0  | 2.0  | 6.0  | ... |
| 6.3 | 75.45 | 5.20 | 28th May | 110 | ... | ... | 19  | 4   | 34  | 166  | 3   | 26.0 | 157.0 | 33.0 | 86.5 | 7.5 | 12.0 | 11.5 | 29.0 | 3.5 |

\* No Anemometer on the station.

## Appendix

## Annual Abstract of Meteorological Observations

BREMUDA.

Lat. 32° 17' N.

| Month.        | Mean Pressure. | Air Temperature. |        |              |          |          |      |           |      |           |      | Tension of Vapour. | Relative Humidity. |      |      |
|---------------|----------------|------------------|--------|--------------|----------|----------|------|-----------|------|-----------|------|--------------------|--------------------|------|------|
|               |                | Hourly Means.    |        | Daily Means. |          | Means of |      | Abs. Min. |      | Abs. Max. |      |                    | Mean.              | Min. |      |
|               |                | 9 a.m.           | 9 p.m. | Simple.      | Reduced. | Min.     | Max. | Temp.     | Day. | Temp.     | Day. |                    |                    | Day. |      |
|               |                |                  |        |              |          |          |      |           |      |           |      |                    |                    |      |      |
| January ...   | 30.253         | 64.1             | ...    | ...          | ...      | 57.9     | 68.4 | 51.6      | 14th | 75.7      | 31st | .408               | 67.6               | 47.6 | 22nd |
| February ...  | 30.169         | 65.0             | ...    | ...          | ...      | 58.7     | 69.5 | 49.0      | 25th | 75.3      | 5th  | .426               | 69.5               | 54.0 | 20th |
| March ...     | 30.054         | 62.4             | ...    | ...          | ...      | 55.1     | 66.9 | 45.1      | 5th  | 73.3      | 17th | .371               | 65.9               | 51.8 | 7th  |
| April ...     | 30.085         | 66.6             | ...    | ...          | ...      | 59.2     | 70.6 | 54.0      | 10th | 79.3      | 25th | .440               | 67.6               | 51.2 | 22nd |
| May...        | 30.146         | 73.6             | ...    | ...          | ...      | 66.1     | 77.4 | 60.0      | 18th | 85.1      | 29th | .588               | 70.2               | 51.0 | 19th |
| June ...      | 30.157         | 76.9             | ...    | ...          | ...      | 70.5     | 81.4 | 64.4      | 10th | 86.1      | 30th | .692               | 74.6               | 58.0 | 10th |
| July ...      | 30.161         | 82.2             | ...    | ...          | ...      | 74.7     | 85.9 | 69.8      | 3rd  | 90.9      | 31st | .781               | 71.2               | 64.0 | 3rd  |
| August ...    | 30.082         | 82.6             | ...    | ...          | ...      | 75.3     | 87.0 | 70.4      | 23rd | 93.3      | 14th | .723               | 65.4               | 50.0 | 24th |
| September ... | 30.043         | 80.0             | ...    | ...          | ...      | 72.8     | 84.4 | 68.8      | 8th  | 88.3      | 1st  | .749               | 72.6               | 57.0 | 1st  |
| October ...   | 30.014         | 77.3             | ...    | ...          | ...      | 70.1     | 80.3 | 61.8      | 29th | 87.7      | 12th | .665               | 71.0               | 50.4 | 19th |
| November ...  | 29.954         | 70.9             | ...    | ...          | ...      | 63.6     | 73.9 | 55.2      | 27th | 82.3      | 3rd  | .516               | 67.8               | 56.0 | 17th |
| December ...  | 30.026         | 64.4             | ...    | ...          | ...      | 58.3     | 68.8 | 47.7      | 7th  | 75.3      | 30th | .462               | 76.0               | 51.2 | 7th  |
| Mean ...      | 30.095         | 72.2             | ...    | ...          | ...      | 65.2     | 76.2 | 58.1      | ...  | 82.7      | ...  | .568               | 69.9               | 53.5 | ...  |

SINGAPORE.

Lat. 1° 16' N.

|               |        |      |     |     |     |      |     |      |      |     |     |       |      |           |
|---------------|--------|------|-----|-----|-----|------|-----|------|------|-----|-----|-------|------|-----------|
| January ...   | 29.320 | 82.7 | ... | ... | ... | 70.2 | ... | 67.2 | 1st  | ... | ... | .877  | 78.7 | 70.4 22nd |
| February ...  | 29.321 | 83.9 | ... | ... | ... | 70.1 | ... | 67.9 | 3rd  | ... | ... | .934  | 80.0 | 74.8 2nd  |
| March ...     | 29.303 | 85.1 | ... | ... | ... | 70.7 | ... | 68.3 | 1st  | ... | ... | .973  | 80.0 | 73.8 23rd |
| April ...     | 29.303 | 85.7 | ... | ... | ... | 70.8 | ... | 69.0 | 28th | ... | ... | 1.035 | 84.2 | 69.5 23rd |
| May ...       | 29.300 | 85.0 | ... | ... | ... | 71.5 | ... | 68.1 | 15th | ... | ... | 1.048 | 87.0 | 81.8 18th |
| June ...      | 29.297 | 84.3 | ... | ... | ... | 70.7 | ... | 69.5 | 9th  | ... | ... | 1.045 | 89.0 | 81.8 16th |
| July ...      | 29.299 | 84.7 | ... | ... | ... | 70.3 | ... | 69.0 | 8th  | ... | ... | 1.032 | 86.5 | 80.6 13th |
| August ...    | 29.301 | 84.8 | ... | ... | ... | 70.0 | ... | 68.0 | 4th  | ... | ... | 1.018 | 86.8 | 78.8 7th  |
| September ... | 29.312 | 82.2 | ... | ... | ... | 69.5 | ... | 68.0 | 14th | ... | ... | .968  | 88.0 | 80.3 4th  |
| October ...   | 29.323 | 83.2 | ... | ... | ... | 69.3 | ... | 68.0 | 16th | ... | ... | 1.001 | 88.0 | 81.4 20th |
| November ...  | 29.305 | 80.8 | ... | ... | ... | 69.6 | ... | 68.0 | 30th | ... | ... | .831  | 89.0 | 78.8 15th |
| December ...  | 29.335 | 78.0 | ... | ... | ... | 68.9 | ... | 66.2 | 5th  | ... | ... | .848  | 88.0 | 72.4 6th  |
| Mean ...      | 29.310 | 83.3 | ... | ... | ... | 70.1 | ... | 68.0 | ...  | ... | ... | .976  | 85.4 | 77.0 ...  |

HONG KONG, CHINA.

Lat. 22° 16' N.

|               |        |      |     |     |     |      |      |      |      |      |      |      |      |           |
|---------------|--------|------|-----|-----|-----|------|------|------|------|------|------|------|------|-----------|
| January ...   | 30.202 | 56.2 | ... | ... | ... | 53.2 | 62.3 | 39.0 | 27th | 70.7 | 6th  | .383 | 84.0 | 66.0 27th |
| February ...  | 30.101 | 58.9 | ... | ... | ... | 56.0 | 64.9 | 50.6 | 22nd | 76.1 | 18th | .440 | 88.3 | 82.0 12th |
| March ...     | 30.017 | 62.4 | ... | ... | ... | 59.2 | 67.3 | 54.1 | 16th | 77.7 | 26th | .508 | 90.4 | 64.6 14th |
| April ...     | 29.905 | 70.6 | ... | ... | ... | 66.2 | 76.7 | 58.9 | 4th  | 89.4 | 27th | .665 | 88.2 | 62.8 22nd |
| May ...       | 29.816 | 77.4 | ... | ... | ... | 73.0 | 83.3 | 64.6 | 19th | 90.5 | 26th | .817 | 86.5 | 60.8 10th |
| June ...      | 29.754 | 83.9 | ... | ... | ... | 79.4 | 89.8 | 75.6 | 25th | 95.9 | 20th | .986 | 85.0 | 69.6 11th |
| July ...      | 29.663 | 82.6 | ... | ... | ... | 77.9 | 89.3 | 75.8 | 3rd  | 96.5 | 25th | .913 | 82.0 | 69.0 28th |
| August ...    | 29.702 | 81.5 | ... | ... | ... | 77.4 | 88.4 | 74.1 | 26th | 95.1 | 13th | .952 | 89.0 | 77.6 2nd  |
| September ... | 29.839 | 81.4 | ... | ... | ... | 76.0 | 88.2 | 73.5 | 17th | 95.9 | 8th  | .795 | 74.4 | 58.1 14th |
| October ...   | 30.012 | 77.3 | ... | ... | ... | 71.1 | 83.2 | 65.0 | 11th | 88.1 | 24th | .651 | 72.6 | 51.2 12th |
| November ...  | 30.057 | 69.5 | ... | ... | ... | 63.9 | 74.4 | 57.0 | 19th | 82.9 | 17th | .545 | 74.5 | 52.1 10th |
| December ...  | 30.152 | 61.8 | ... | ... | ... | 57.3 | 67.7 | 48.8 | 25th | 72.2 | 16th | .451 | 81.0 | 65.3 18th |
| Mean ...      | 29.935 | 72.0 | ... | ... | ... | 67.5 | 77.9 | 61.8 | ...  | 85.9 | ...  | .677 | 83.0 | 64.9 ...  |

No. X.—continued.

taken at Foreign Stations in the Year 1876.

Long. 64° 47' W. Height of Barometer Cistern above Sea, 151 feet.

| Mean Amount of Cloud. | Rainfall. |          |          | Weather.       |       |       |                 |      |            |           |        |     | Wind.                                    |      |      |      |      |      |      |        |     |     |     |
|-----------------------|-----------|----------|----------|----------------|-------|-------|-----------------|------|------------|-----------|--------|-----|------------------------------------------|------|------|------|------|------|------|--------|-----|-----|-----|
|                       | Total.    | Maximum. | Day.     | No. of Days of |       |       |                 |      |            |           |        |     | Number of Observations under each Point. |      |      |      |      |      |      |        |     |     |     |
|                       |           |          |          | Rain.          | Snow. | Hail. | Thunder Storms. | Fog. | Clear SKY. | Overcast. | Gales. | N.  | N.E.                                     | E.   | S.E. | S.   | S.W. | W.   | N.W. | Calms. |     |     |     |
|                       |           |          |          |                |       |       |                 |      |            |           |        |     |                                          |      |      |      |      |      |      |        |     |     |     |
| 6.0                   | 1.63      | 0.48     | 25th     | 12             | ...   | ...   | ...             | ...  | ...        | 5.0       | 13.6   | 1   | 6.5                                      | 3.5  | ...  | ...  | 1.0  | 7.0  | 8.0  | 3.5    | 1.5 | ... |     |
| 5.5                   | 2.57      | 0.80     | 23rd     | 14             | ...   | ...   | ...             | ...  | ...        | 9.0       | 12.0   | 2   | 4.0                                      | 2.0  | ...  | ...  | 3.5  | 1.0  | 6.0  | 5.0    | 6.5 | 1.0 | ... |
| 6.0                   | 5.59      | 1.15     | 29th     | 17             | ...   | ...   | 1               | ...  | ...        | 5.0       | 12.0   | 4   | 10.0                                     | 5.0  | 2.0  | ...  | 2.0  | 4.0  | 2.0  | 6.0    | 0.0 | 0.0 |     |
| 6.0                   | 3.34      | 1.02     | 18th     | 10             | ...   | 1     | 3               | ...  | ...        | 5.0       | 12.0   | 1   | 3.5                                      | 3.5  | 1.0  | 0.5  | 0.5  | 11.0 | 5.5  | 4.5    | ... | ... |     |
| 5.5                   | 5.03      | 3.82     | 30th     | 14             | ...   | ...   | ...             | ...  | ...        | 8.0       | 12.0   | ... | 3.0                                      | 4.0  | 3.0  | 2.0  | 2.0  | 12.0 | 3.0  | 2.0    | ... | ... |     |
| 6.0                   | 7.59      | 2.12     | 7th      | 15             | ...   | ...   | 2               | ...  | ...        | 6.0       | 11.0   | ... | 1.0                                      | 2.0  | 3.0  | 5.5  | 6.0  | 8.5  | 3.5  | 0.5    | ... | ... |     |
| 5.1                   | 3.41      | 1.31     | 16th     | 13             | ...   | ...   | 1               | ...  | ...        | 10.0      | 7.0    | ... | 3.0                                      | 1.5  | 0.5  | 2.5  | 3.0  | 12.0 | 6.5  | 1.5    | 0.5 | ... |     |
| 5.0                   | 0.58      | 0.28     | 5th      | 9              | ...   | ...   | 1               | ...  | ...        | 9.5       | 9.0    | ... | 3.5                                      | 8.5  | 0.5  | 3.0  | 1.5  | 4.0  | 7.0  | 2.5    | 0.5 | ... |     |
| 5.9                   | 7.58      | 3.05     | 3rd      | 18             | ...   | ...   | 4               | ...  | ...        | 6.0       | 10.0   | 1   | 1.5                                      | 0.5  | 1.5  | 3.0  | 2.0  | 11.0 | 6.5  | 3.5    | 0.5 | ... |     |
| 5.0                   | 5.93      | 2.35     | 1st      | 13             | ...   | ...   | 1               | ...  | ...        | 7.5       | 9.5    | 3   | 3.0                                      | 3.0  | 1.0  | 2.0  | 3.0  | 9.0  | 6.0  | 2.0    | 2.0 | ... |     |
| 5.9                   | 4.20      | 1.10     | 25th     | 14             | ...   | ...   | ...             | ...  | ...        | 7.0       | 12.5   | 2   | 3.0                                      | 5.0  | 2.0  | 3.5  | 0.5  | 3.5  | 5.0  | 7.5    | ... | ... |     |
| 7.0                   | 7.26      | 1.33     | 25th     | 23             | ...   | ...   | 1               | ...  | ...        | ...       | 18.5   | 2   | 4.0                                      | 4.0  | ...  | ...  | 1.0  | 3.0  | 4.0  | 8.0    | 5.0 | 2.0 |     |
| 5.7                   | 55.7      | 3.82     | 30th May | 172            | ...   | 1     | 14              | ...  | ...        | 78.0      | 135.6  | 16  | 46.0                                     | 42.5 | 14.5 | 26.5 | 25.5 | 92.0 | 66.0 | 46.0   | 8.0 | ... |     |

Long. 105° 31' E. Height of Barometer Cistern above Sea, 116 feet.

|     |       |      |           |     |     |     |    |     |       |     |     |     |     |     |     |     |     |     |     |     |     |
|-----|-------|------|-----------|-----|-----|-----|----|-----|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 4.0 | 4.18  | 0.95 | 12th      | 12  | ... | ... | 3  | ... | 14.0  | 2.0 | ... | ... | 31  | ... | ... | ... | ... | ... | ... | ... | ... |
| 3.3 | 1.90  | 1.32 | 29th      | 5   | ... | ... | 1  | ... | 17.0  | ... | ... | ... | 29  | ... | ... | ... | ... | ... | ... | ... | ... |
| 3.8 | 4.30  | 1.25 | 3rd       | 14  | ... | ... | 9  | ... | 15.0  | 1.0 | ... | ... | 31  | ... | ... | ... | ... | ... | ... | ... | ... |
| 3.8 | 7.62  | 1.05 | 28th      | 21  | ... | ... | 8  | ... | 12.5  | 0.5 | ... | ... | ... | ... | ... | ... | 30  | ... | ... | ... | ... |
| 3.9 | 5.05  | 1.08 | 27th      | 16  | ... | ... | 10 | ... | 12.5  | 0.5 | ... | ... | ... | ... | ... | ... | 31  | ... | ... | ... | ... |
| 4.0 | 7.41  | 1.10 | 22nd      | 24  | ... | ... | 6  | ... | 11.5  | 1.0 | ... | ... | ... | ... | ... | ... | 30  | ... | ... | ... | ... |
| 3.6 | 1.94  | 0.30 | 2nd       | 12  | ... | ... | 4  | ... | 17.5  | ... | ... | ... | ... | ... | ... | ... | 31  | ... | ... | ... | ... |
| 3.8 | 6.80  | 1.35 | 30th      | 13  | ... | ... | 6  | ... | 13.5  | 0.5 | ... | ... | ... | ... | ... | ... | 31  | ... | ... | ... | ... |
| 4.1 | 9.84  | 1.11 | 15th      | 16  | ... | ... | 8  | ... | 10.0  | 0.5 | ... | ... | ... | ... | ... | ... | 30  | ... | ... | ... | ... |
| 4.1 | 9.43  | 0.96 | 21st      | 22  | ... | ... | 7  | ... | 10.5  | 0.5 | ... | ... | 31  | ... | ... | ... | ... | ... | ... | ... | ... |
| 4.0 | 10.13 | 2.43 | 14th      | 21  | ... | ... | 8  | ... | 12.0  | ... | ... | ... | 30  | ... | ... | ... | ... | ... | ... | ... | ... |
| 4.7 | 9.68  | 1.45 | 5th       | 27  | ... | ... | 6  | ... | 5.5   | 0.5 | ... | ... | 31  | ... | ... | ... | ... | ... | ... | ... | ... |
| 3.9 | 78.28 | 2.43 | 14th Nov. | 206 | ... | ... | 76 | ... | 151.5 | 7.0 | ... | ... | 183 | ... | ... | ... | 183 | ... | ... | ... | ... |

Long. 114° 9' E. Height of Barometer Cistern above Sea, 43 feet.

|     |       |      |          |     |     |     |     |      |      |       |     |      |      |       |      |      |      |      |      |      |
|-----|-------|------|----------|-----|-----|-----|-----|------|------|-------|-----|------|------|-------|------|------|------|------|------|------|
| 5.8 | 1.20  | 0.98 | 24th     | 5   | ... | ... | 3   | 11.0 | 16.0 | ...   | 4.5 | 6.5  | 13.5 | 0.5   | 0.5  | 1.5  | 1.5  | 2.0  | 0.5  | ...  |
| 9.2 | 0.23  | 0.10 | 17th     | 5   | ... | ... | 3   | 4.5  | 24.0 | ...   | 1.0 | 1.5  | 19.0 | 3.5   | ...  | 1.0  | 3.0  | ...  | ...  | ...  |
| 9.4 | 11.07 | 2.76 | 24th     | 22  | ... | ... | 6   | 2    | 1.0  | 30.0  | ... | 1.0  | 4.0  | 22.0  | 2.0  | ...  | 0.5  | 1.0  | ...  | 0.5  |
| 7.3 | 5.32  | 1.36 | 6th      | 11  | ... | ... | 3   | 8.5  | 20.5 | ...   | ... | 5.0  | 19.5 | 3.0   | ...  | 1.0  | 1.6  | ...  | ...  | ...  |
| 6.6 | 11.02 | 3.25 | 15th     | 16  | ... | ... | 2   | 8.0  | 17.0 | ...   | ... | 2.0  | 16.0 | 7.5   | ...  | 2.5  | ...  | 1.5  | 1.6  | ...  |
| 8.2 | 7.23  | 2.44 | 25th     | 17  | ... | ... | ... | 0.5  | 22.5 | ...   | ... | 0.5  | 2.5  | 8.0   | 6.5  | 16.5 | 0.5  | ...  | 0.6  | ...  |
| 8.5 | 22.51 | 5.00 | 19th     | 22  | ... | ... | 3   | ...  | 23.0 | ...   | 1   | ...  | 2.5  | 10.0  | 5.5  | 9.0  | ...  | ...  | 4.0  | ...  |
| 8.0 | 34.35 | 5.80 | 5th      | 23  | ... | ... | ... | 0.5  | 20.0 | ...   | 2   | ...  | 1.5  | 6.0   | 2.5  | 12.5 | ...  | 1.5  | 1.0  | ...  |
| 8.0 | 6.00  | 1.50 | 25th     | 11  | ... | ... | 2   | 8.5  | 11.5 | ...   | 1   | ...  | 7.5  | 15.5  | 1.5  | ...  | 3.0  | 0.5  | ...  | ...  |
| 4.5 | 1.17  | 0.41 | 24th     | 5   | ... | ... | ... | 14.5 | 6.0  | ...   | ... | 0.5  | 6.5  | 18.0  | 0.5  | 0.5  | 3.0  | ...  | 1.0  | 1.0  |
| 4.8 | 1.34  | 0.76 | 19th     | 5   | ... | ... | ... | 13.5 | 10.5 | ...   | ... | 1.0  | 13.5 | 11.0  | ...  | ...  | ...  | 0.5  | 2.0  | 1.0  |
| 3.8 | 4.08  | 1.35 | 1st      | 5   | ... | ... | ... | 20.5 | 9.0  | ...   | 1   | 3.0  | 8.5  | 11.0  | 0.5  | ...  | 1.0  | 1.5  | 3.0  | 2.5  |
| 6.7 | 105.5 | 5.80 | 5th Aug. | 145 | ... | ... | 16  | 12   | 91.0 | 210.0 | 5   | 11.0 | 67.0 | 156.0 | 38.0 | 15.5 | 52.5 | 10.5 | 11.5 | 14.0 |

No daily record of observations kept; six months entered as N.E., and six months as S.W. Monsoon.

## Appendix

## Summary of Results of Meteorological Observations

| Stations, with their Height<br>above the Sea. | Mean Pressure.                       | Air Temperature. |          |      |           |       |           |       |          | Tension of Vapour. | Relative Humidity. |      |          |
|-----------------------------------------------|--------------------------------------|------------------|----------|------|-----------|-------|-----------|-------|----------|--------------------|--------------------|------|----------|
|                                               |                                      | Hourly<br>Means. | Means of |      | Abs. Min. |       | Abs. Max. |       | Mean.    |                    | Min.               |      |          |
|                                               |                                      |                  | 9 a.m.   | Min. | Max.      | Temp. | Day.      | Temp. |          |                    | Day.               | Day. |          |
|                                               |                                      |                  |          |      |           |       |           |       |          |                    |                    |      |          |
| African, Mediterranean.                       | Gibraltar ... .. ft.                 | 30.039           | 65.3     | 59.9 | 73.3      | 40.0  | 9 Jan.    | 95.0  | 25 July  | .495               | 77.0               | 36.0 | 5 Jan.   |
|                                               | Malta ... .. 70                      | 29.992           | 68.5     | 62.5 | 72.0      | 44.2  | 21 Mar.   | 91.0  | 12 Sept. | .558               | 77.7               | 48.2 | 14 May   |
|                                               | Scutari ... .. 60                    | 29.947           | 59.2     | 49.9 | 68.5      | 23.0  | 1 Jan.    | 98.0  | 15 Sept. | .402               | 75.7               | 45.6 | 28 June  |
|                                               | Natal (Fort Napier)... 2,200         | 29.947           | 66.5     | 53.6 | 78.9      | 34.6  | 30 June   | 106.2 | 14 Dec.  | .408               | 61.3               | 23.0 | 5 Oct.   |
| America & W. Indian.                          | Sierra Leone... .. 224               | 29.938           | 81.8     | 70.5 | 89.4      | 63.0  | 3 Nov.    | 98.0  | 10 Feb.  | .863               | 79.6               | 55.0 | 15 Feb.  |
|                                               | Barbadoes ... .. 30                  | 30.031           | 81.9     | 73.8 | 85.9      | 64.0  | 16 Jan.   | 93.0  | 11 Sept. | .742               | 67.9               | 46.0 | 25 Mar.  |
|                                               | Newcastle, Jamaica... 3,800          | 30.085           | 69.4     | 68.9 | 78.1      | 51.0  | 3 Dec.    | 87.0  | 30 Sept. | .534               | 74.1               | 45.0 | 11 Jan.  |
|                                               | Up-Park Camp,<br>Jamaica... .. } 235 | 29.981           | 84.7     | 61.1 | ...       | 50.0  | 2 Dec.    | ...   | ...      | .699               | 59.4               | 43.0 | 9 Jan.   |
|                                               | Nassau, Bahamas ... 44               | 30.108           | 78.6     | 70.2 | 83.7      | 53.5  | 1 Dec.    | 94.6  | 17 July  | .685               | 69.3               | 49.0 | 6 April  |
|                                               | Bermuda ... .. 151                   | 30.095           | 72.2     | 65.2 | 76.2      | 45.1  | 5 Mar.    | 93.3  | 14 Aug.  | .568               | 69.9               | 47.6 | 22 Jan.  |
|                                               | Singapore ... .. 110                 | 29.310           | 83.3     | 70.1 | ...       | 66.2  | 5 Dec.    | ...   | ...      | .976               | 85.4               | 69.5 | 23 April |
|                                               | Hong Kong ... .. 45                  | 29.935           | 72.0     | 67.5 | 77.9      | 39.0  | 27 Jan.   | 96.5  | 28 July  | .677               | 83.0               | 51.2 | 12 Oct.  |

## No. X.—continued.

taken at Foreign Stations in the year 1876.

| Mean amount of Cloud. | Rainfall. |      |          | Weather.       |       |       |                 |      |            |           |        | Wind.                                 |       |       |       |      |       |       |       |        |    |       |           | Latitude. | Longitude. |
|-----------------------|-----------|------|----------|----------------|-------|-------|-----------------|------|------------|-----------|--------|---------------------------------------|-------|-------|-------|------|-------|-------|-------|--------|----|-------|-----------|-----------|------------|
|                       | Total.    | Max. | Day.     | No. of days of |       |       |                 |      |            |           |        | No. of Observations under each point. |       |       |       |      |       |       |       | Calms. |    |       |           |           |            |
|                       |           |      |          | Rain.          | Snow. | Hail. | Thunder Storms. | Fog. | Clear Sky. | Overcast. | Gales. | N.                                    | N.E.  | E.    | S.E.  | S.   | S.W.  | W.    | N.W.  |        |    |       |           |           |            |
|                       |           |      |          |                |       |       |                 |      |            |           |        |                                       |       |       |       |      |       |       |       |        |    |       |           |           |            |
| 3.8                   | 31.62     | 2.60 | 8 Nov.   | 80             | ...   | 1     | 3               | 4.5  | 194.5      | 85.5      | 14     | 10.0                                  | 15.5  | 130.0 | 9.5   | 9.5  | 23.5  | 118.0 | 49.5  | 0.5    | 36 | 6 N.  | 5 20 W.   |           |            |
| 4.7                   | 11.23     | 1.44 | 16 Oct.  | 51             | ...   | ...   | 1               | ...  | 100.5      | 106.5     | ...    | 9.0                                   | 62.5  | 5.0   | 70.5  | 4.0  | 44.0  | 12.5  | 158.5 | ...    | 35 | 53 N. | 14 30 E.  |           |            |
| 5.4                   | 30.18     | 3.10 | 5 July   | 122            | 11    | 1     | 22              | 1.0  | 134.0      | 137.5     | 5      | 49.0                                  | 120.5 | 36.0  | 11.0  | 50.0 | 60.0  | 14.5  | 6.0   | 14.5*  | 41 | 00 N. | 29 3 E.   |           |            |
| 5.2                   | 28.93     | 2.90 | 26 Oct.  | 93             | ...   | 1     | 62              | ...  | 163.0      | 180.5     | 3      | 9.5                                   | 47.5  | 199.5 | 56.5  | 14.0 | 1.5   | 4.5   | 23.0  | 10.0   | 29 | 3 S.  | 30 2 E.   |           |            |
| 6.1                   | 172.92    | 4.5  | 12 July  | 167            | ...   | ...   | 53              | ...  | 29.5       | 88.0      | 13     | 120.0                                 | 19.0  | 50.5  | 1.5   | 6    | 1.5   | 144.0 | 2.0   | 27.0   | 8  | 29 N. | 13 9 W.   |           |            |
| 3.3                   | 50.61     | 3.50 | 24 Sept. | 119            | ...   | ...   | 7               | ...  | 25.5       | 90.5      | 4      | 5                                     | 288.5 | 31.0  | 45.5  | ...  | 0.5   | ...   | ...   | ...    | 13 | 4 N.  | 59 40 W.  |           |            |
| 4.5                   | 124.12    | 5.80 | 15 Oct.  | 178            | ...   | ...   | 21              | ...  | 141.0      | 84.0      | 15     | 2.0                                   | 22.5  | 38.0  | 71.0  | 28.5 | 9.0   | 7.0   | 25.0  | 163.0  | 18 | 62 N. | 76 42 W.  |           |            |
| 3.6                   | 60.63     | 5.91 | 14 Oct.  | 111            | ...   | ...   | 14              | ...  | 206.5      | 8.5       | 3      | 7.5                                   | 64.0  | 48.0  | 169.5 | 2.5  | 1.0   | 5     | ...   | †      | 17 | 59 N. | 76 56 W.  |           |            |
| 6.3                   | 75.45     | 5.20 | 28 May   | 110            | ...   | ...   | 19              | 4.0  | 34.0       | 156.0     | 3      | 26.0                                  | 157.0 | 33.0  | 86.5  | 7.5  | 12.0  | 11.5  | 29.0  | 3.5    | 25 | 5 N.  | 77 21 W.  |           |            |
| 5.7                   | 55.7      | 3.82 | 30 May   | 172            | ...   | 1     | 14              | ...  | 78.0       | 138.5     | 16     | 46.0                                  | 42.5  | 14.5  | 26.5  | 25.5 | 92.0  | 66.0  | 45.0  | 8.0    | 32 | 17 N. | 64 47 W.  |           |            |
| 3.9                   | 78.28     | 2.13 | 14 Nov.  | 206            | ...   | ...   | 76              | ...  | 151.5      | 7.0       | ...    | ...                                   | 183.0 | ...   | ...   | ...  | 183.0 | ...   | ...   | ‡      | 1  | 16 N. | 105 31 E. |           |            |
| 6.7                   | 105.5     | 5.80 | 5 Aug.   | 145            | ...   | ...   | 16              | 12.0 | 91.0       | 210.0     | 5      | 11.0                                  | 57.0  | 156.0 | 38.0  | 15.5 | 52.5  | 10.5  | 11.5  | 14.0   | 22 | 16 N. | 114 9 E.  |           |            |

\* Scutari. Observations on Wind 4½ days short.

† Up-Park Camp. Observations incomplete, see Abstract.

‡ Singapore. Observations on Wind not daily recorded, 6 months returned as N.E., and 6 months as S.W. Monsoon.

## APPENDIX No. XI.

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 THE ALEXANDER MEMORIAL FUND.
 

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## COMMITTEE.

Sir WILLIAM M. MUIR, K.C.B., M.D., Hon. Physician to the Queen, Director-General, *President*.  
 Sir T. GALBRAITH LOGAN, K.C.B., M.D., Hon. Physician to the Queen.  
 Surgeon-General T. G. BALFOUR, M.D., F.R.S.  
 Surgeon-General T. LONGMORE, C.B., Hon. Surgeon to the Queen, Professor of Military Surgery.  
 Deputy Surgeon-General J. A. BOSTOCK, C.B., M.D., Hon. Surgeon to the Queen  
 Deputy Surgeon-General W. J. FYFFE, M.D.  
 Surgeon-Major F. S. B. F. DE CHAUMONT, Professor of Military Hygiene.  
 R. LAWSON, Esq., M.D., Inspector-General of Hospitals.  
 Surgeon-General W. RUTHERFORD, C.B., M.D.  
 Surgeon-General W. MUNRO, C.B., M.D.  
 Deputy Surgeon-General Sir ANTHONY D. HOME, K.C.B., V.C.  
 Surgeon-Major FREDERICK ROBINSON, M.D., Scots Guards.

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At a meeting of the Committee, held on the 8th of April, 1876, at the Office of the Army Medical Department, 6, Whitehall Yard, it was determined that the Alexander Memorial Prize of 50*l.*, and a Gold Medal of the value of 10*l.*, be offered for the best Essay—

“On the influence of drinking-water in originating or propagating enteric fever, diarrhœa, dysentery, *and*\* cholera : to be illustrated, as far as possible “by instances which have come under the personal observation of the author.”

The Essay to be legibly and clearly written, superscribed with a brief motto, and accompanied by a sealed envelope similarly superscribed, containing the name and address of the author.

Essays to be despatched to the President, Alexander Memorial Fund Committee, on or before the 31st December, 1878.

The competition to be limited to Executive Medical Officers of the Army on full-pay.

The relative merits of the Essays to be determined by Assessors selected by the Committee.

The Prize to be awarded to the writer of the best Essay offered, without reference to the number of competitors, provided the writer has complied with the prescribed conditions.

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\* Not of cholera, as was previously announced.











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